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ENDANGERED SPECIES

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Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Rare Hawaiian Tree Listed as Endangered

An attractive but rare Hawaiian tree, *Kokia drynarioides* (Hawai'i tree cotton, *koki'o*, or *hau-hele'ula*), has been listed by the Service as Endangered (12/4/84), and it is now eligible for the protection authorized under the Endangered Species Act. Due to the effects of livestock grazing, destruction of seeds by exotic rodents, competitive introduced plants, and fire, this species is on the verge of extinction. One small population, which consists of only about 15 trees, is all that is known to survive.

Kokia drynarioides is a small tree, growing up to about 25 feet in height, and has palmately lobed leaves, large red flowers, and three large bracts at the base of the flower and fruit. It is endemic to the Island of Hawai'i, and the remaining individuals currently are scattered within or near the Ka'upulehu Forest Reserve and the adjoining Pu'uwa'awa'a Ranch.

Habitat within the species' historical range has been greatly modified by many years of management as rangeland for livestock, and the plants them-

selves apparently are extremely palatable to cattle and feral herbivores. Cattle browse on the mature trees and graze any seedlings that may occur. Accidentally introduced rodents, particularly the roof rat (*Rattus rattus*), eat many of the seeds. The recent invasion of the habitat by an exotic plant, fountain grass (*Pennisetum setaceum*), further inhibits regeneration and threatens the adult trees by increasing the probability, extent, and intensity of wildfires.

On September 12, 1983, the Service proposed to list *Kokia drynarioides* as an Endangered species, and to designate its Critical Habitat. (See story in BULLETIN Vol. VIII No. 10.) Comments supporting the proposal were received from the Hawaii Department of Land and Natural Resources; the Office of the Mayor, Hawaii County; and several individuals.

With publication of a final rule, *Kokia drynarioides* is now listed as an Endangered species. Among the benefits it receives under the Endangered Species Act are protection from interstate/international trafficking in the species, a re-

quirement for the Service to develop a recovery plan, possible Federal funding for State conservation efforts, and Section 7 protection from certain Federal activities.

Under Section 7 of the Act, Federal agencies now are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of *Kokia drynarioides* or adversely modify its Critical Habitat. The designated Critical Habitat includes three areas in the North Kona District, Island of Hawai'i, totalling about 3.86 square miles of private and State-owned lands that are primarily used for cattle grazing. Since there is no Federal involvement in this use of the land, no economic impacts of the Critical Habitat designation are anticipated.

Although the Federal Endangered Species Act does not authorize the Service to prohibit the taking of Endangered plants that are not on Federal lands, the State of Hawaii's own legislation does, and this protection now applies to *Kokia drynarioides*.

Recovery Plans for Four Southwest U.S. Cacti

Among the species for which recovery plans have been approved within the past year are four Endangered or Threatened cacti native to the southwestern United States. All four are facing serious threats from a variety of human activities, particularly habitat modification and overcollecting. The recovery plans, when funded and carried out, may help to restore the following cacti to a more secure status:

Mesa Verde cactus (*Sclerocactus mesae-verdae*)

Named for the Mesa Verde area of southwestern Colorado, this cactus occurs only in parts of Montezuma County, Colorado, and San Juan County, New Mexico. After experiencing a dramatic decline, the Mesa Verde cactus was listed by the Service on Oc-

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The Mesa Verde cactus (*Sclerocactus mesae-verdae*) can reach up to about 6.5 cm in height. Cracks in the clay soil, where the seeds fall and may germinate, apparently are an important part of the plant's microhabitat.

Photo by Kenneth D. Heil



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of December:

Region 1—Twelve Guam rails (*Rallus owstoni*) and nine Micronesian king-

fishers (*Halcyon cinnamomina cinnamomina*) that were sent by the government of Guam to the Philadelphia Zoo last November have been translocated to the National Zoological Park in Front Royal, Virginia, and the

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska.

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Bronx Zoo in New York City. It is hoped that the birds will breed successfully there.

In 1982, a study was begun to investigate the status of gray wolves (*Canis lupus*) in central Idaho and the availability of key habitats. This study was completed in 1984, and the results are reported in a document entitled "Wolves of Central Idaho." Information on the geographical relationship of key wolf habitats and existing or proposed land uses should benefit resource agencies and land managers in their ability to manage for wolves, multiple land use, and the integrated needs of both. This information also can be a useful step toward the recovery of gray wolves in Idaho. Limited copies of the publication are available from the Endangered Species Field Office, U.S. Fish and Wildlife Service, 4696 Overland Road, Room 566, Boise, Idaho 83705.

Region 2—The National Audubon Society and the Arizona Game and Fish Department sponsored a December meeting of biologists in Tucson, Arizona, to discuss the biology of the masked bobwhite (*Colinus virginianus ridgwayi*). Habitat requirements, potential reintroduction sites, and status of the species in Mexico were a few of the items discussed.

Plans have been approved to release captive-reared bald eagles (*Haliaeetus leucocephalus*) in Sequoyah National Wildlife Refuge in Oklahoma this spring. Chicks for this release will be obtained from eggs removed from wild nests in Florida (a total of 18 eggs from 9 nests). It is believed that the Florida birds will recycle and that productivity of the Florida population should not be adversely affected. In addition, there are plans to study the three known wild bald eagle nests in Oklahoma to determine the reasons for poor reproductive performance during the last several years. This work is being conducted cooperatively by the George Miksch Sutton Avian Research Center, the States of Oklahoma and Florida, and the Service (Regions 2 and 4).

A record number (14) of young whooping cranes (*Grus americana*) was observed at Aransas National Wildlife Refuge in Texas this month; the previous high number was the 12 young observed in 1976. Also, 69 adult cranes are on the refuge, bringing the total number of cranes to 83—another new record. New Mexico boasts 30 whooping cranes wintering there this year,

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List of Approved Recovery Plans

Restoring Endangered or Threatened animals and plants to the point where they are again secure, self-sustaining members of their ecosystems is one of the main goals of the Endangered Species Program. To help guide the recovery effort, the Fish and Wildlife Service is working to develop plans for all listed species native to the United States. As of December 31, 1984, 164 recovery plans for 195 species have been completed and approved. Many others are in various stages of development. Recovery plans also may be revised, if and when appropriate.

The amount of available funding and personnel resources affects the speed at which recovery plans can be implemented. Guidelines for setting priorities in preparing and carrying-out recovery plans were published in the September 21, 1983, *Federal Register* (see story in BULLETIN Vol. VIII No. 10.)

Copies of recovery plans are available for purchase from the Fish and Wildlife Reference Service about 6 months after they are approved. Inquiries should be addressed to the Fish and Wildlife Reference Service, 1776 E. Jefferson Street, Suite 470 S, Rockville, Maryland 20852, or call toll-free 800/ 582-3421.

Endangered and Threatened Species Having Recovery Plans

Common Name	Scientific Name	Date Plan Approved
MAMMALS 21 species		
Big-eared bats		05/08/84
Ozark big-eared bat	<i>Plecotus townsendii ingens</i>	
Virginia big-eared bat	<i>Plecotus townsendii virginianus</i>	
Black-footed ferret	<i>Mustela nigripes</i>	06/25/78
Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	10/21/76
Delmarva Peninsula fox squirrel	<i>Sciurus niger cinereus</i>	11/06/79
Eastern cougar	<i>Felis concolor cougar</i>	08/02/82
Eastern timber wolf	<i>Canis lupus lycaon</i>	06/05/78
Florida panther	<i>Felis concolor coryi</i>	12/16/81
Gray bat	<i>Myotis grisescens</i>	07/08/82
Grizzly bear	<i>Ursus arctos horribilis</i>	01/29/82
Hawaiian monk seal	<i>Monachus schauinslandi</i>	04/01/83
Indiana bat	<i>Myotis sodalis</i>	06/01/76
Key deer	<i>Odocoileus virginianus clavium</i>	06/10/80
Mexican wolf	<i>Canis lupus baileyi</i>	08/09/82
Morro Bay kangaroo rat	<i>Dipodomys heermanni morroensis</i>	08/18/82
Northern Rocky Mountain wolf	<i>Canis lupus irremotus</i>	05/28/80
Red wolf	<i>Canis rufus</i>	07/12/82
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	01/31/83
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	12/30/82
Southern sea otter	<i>Enhydra lutris nereis</i>	02/03/82
West Indian manatee	<i>Trichechus manatus</i>	04/15/80
BIRDS 53 species		
Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	03/07/79
Attwater's greater prairie chicken	<i>Tympanuchus cupido attwateri</i>	12/16/83
Bald eagle	<i>Haliaeetus leucocephalus</i>	
Chesapeake Bay Region Plan		05/19/82
Southwestern Population Plan		09/08/82
Northern States Plan		07/29/83
Southeastern States Plan		08/03/84
California brown pelican	<i>Pelecanus occidentalis californicus</i>	02/03/83
California condor	<i>Gymnogyps californianus</i>	04/09/75
California least tern	<i>Sterna antillarum browni</i>	04/02/80
Cape Sable seaside sparrow	<i>Ammospiza maritima mirabilis</i>	04/06/83
Channel Islands species		01/26/84
San Clemente loggerhead shrike	<i>Lanius ludovicianus mearnsi</i>	
San Clemente sage sparrow	<i>Amphispiza belli clementeae</i>	
Dusky seaside sparrow	<i>Ammospiza maritima nigrescens</i>	04/26/79
Eastern brown pelican	<i>Pelecanus occidentalis carolinensis</i>	07/19/79
Everglade kite	<i>Rostrhamus sociabilis plumbeus</i>	03/11/83
Four Hawai'i forest birds		02/03/83
'Akiapola'au	<i>Hemignathus munroi</i>	
Hawai'i 'akepa	<i>Loxops coccineus coccineus</i>	
Hawai'i creeper	<i>Oreomystis mana</i>	
'O'u	<i>Psittirostra psittacea</i>	
Hawaiian crow or 'alala	<i>Corvus hawaiiensis</i>	10/28/82
Hawaiian hawk	<i>Buteo solitarius</i>	05/09/84
Hawaiian seabirds		04/25/83
Hawaiian dark-rumped petrel	<i>Pterodroma phaeopygia sandwichensis</i>	
Newell's Manx shearwater	<i>Puffinus auricularis newelli</i>	

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Endangered and Threatened Species Having Recovery Plans

Common Name	Scientific Name	Date Plan Approved
Hawaiian waterbirds		06/19/78
Hawaiian coot	<i>Fulica americana alai</i>	
Hawaiian duck or koloa	<i>Anas wyvilliana</i>	
Hawaiian gallinule	<i>Gallinula chloropus sandvicensis</i>	
Hawaiian stilt	<i>Himantopus himantopus knudseni</i>	
Kaua'i forest birds		07/29/83
Kaua'i 'aki'aki	<i>Hemignathus procerus</i>	
Kaua'i 'o'o	<i>Moho braccatus</i>	
Large Kaua'i thrush	<i>Phaeornis obscurus myadestina</i>	
Nukupu'u	<i>Hemignathus lucidus</i>	
'O'u	<i>Psittirostra psittacea</i>	
Small Kaua'i thrush	<i>Phaeornis palmeri</i>	
Kirtland's warbler	<i>Dendroica kirtlandii</i>	10/22/76
Laysan duck	<i>Anas laysanensis</i>	12/17/82
Light-footed clapper rail	<i>Rallus longirostris levipes</i>	07/03/79
Masked bobwhite	<i>Colinus virginianus ridgwayi</i>	02/15/78
Maui-Moloka'i forest birds		05/30/84
Crested honeycreeper	<i>Palmeria dolei</i>	
Maui 'akepa	<i>Loxops coccineus ochraceus</i>	
Maui parrotbill	<i>Pseudonestor xanthophrys</i>	
Moloka'i creeper	<i>Oreomystis flammea</i>	
Moloka'i thrush	<i>Phaeornis obscurus rutha</i>	
Nukupu'u	<i>Hemignathus lucidus</i>	
Po'ouli	<i>Melamprosops phaeosoma</i>	
Mississippi sandhill crane	<i>Grus canadensis pulla</i>	10/24/79
Nene or Hawaiian goose	<i>Nesochen sandvicensis</i>	02/14/83
Northwestern Hawaiian Islands		10/04/84
Passerine birds		
Laysan finch	<i>Telespyza cantans</i>	
Nihoa finch	<i>Telespyza ultima</i>	
Nihoa millerbird	<i>Acrocephalus familiaris kingi</i>	
Palila	<i>Loxioides bailleui</i>	01/23/78
Peregrine falcon	<i>Falco peregrinus</i>	
Rocky Mountain/Southwest Plan		08/03/77
Eastern Plan		08/20/79
Alaska Population Plan		10/04/82
Pacific Plan		10/12/82
Puerto Rican plain pigeon	<i>Columba inornata wetmorei</i>	10/14/82
Puerto Rican parrot	<i>Amazona vittata</i>	11/30/82
Puerto Rican whip-poor-will	<i>Caprimulgus noctitherus</i>	04/19/84
Red-cockaded woodpecker	<i>Picoides borealis</i>	08/24/79
Whooping crane	<i>Grus americana</i>	01/23/83
Yellow-shouldered blackbird	<i>Agelaius xanthomus</i>	05/25/83
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	02/04/83
REPTILES 15 species		
American crocodile	<i>Crocodylus acutus</i>	02/13/79
Blunt-nosed leopard lizard	<i>Gambelia silus</i>	04/18/80
Culebra Island giant anole	<i>Anolis roosevelti</i>	01/28/83
Eastern indigo snake	<i>Drymarchon corais couperi</i>	04/22/82
Island night lizard (Channel Islands Plan)	<i>Xantusia riversiana</i>	01/26/84
Leatherback sea turtle	<i>Dermochelys coriacea</i>	10/23/81
Marine turtles		09/19/84
Green sea turtle	<i>Chelonia mydas</i>	
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	
Leatherback sea turtle (revised)	<i>Dermochelys coriacea</i>	
Loggerhead sea turtle	<i>Caretta caretta</i>	
Olive Ridley sea turtle	<i>Lepidochelys olivacea</i>	
Mona boa	<i>Epicrates monensis monensis</i>	04/19/84
Mona ground iguana	<i>Cyclura stejnegeri</i>	04/19/84
Plymouth red-bellied turtle	<i>Pseudemys rubriventris bangsi</i>	03/26/81
St. Croix ground lizard	<i>Ameiva polops</i>	03/29/84
AMPHIBIANS 6 species		
Desert slender salamander	<i>Batrachoseps aridus</i>	08/12/82
Golden coqui	<i>Eleutherodactylus jasperii</i>	04/19/84

Endangered and Threatened Species Having Recovery Plans

Common Name	Scientific Name	Date Plan Approved
Houston toad	<i>Bufo houstonensis</i>	09/17/84
Red Hills salamander	<i>Phaeognathus hubrichti</i>	11/23/83
San Marcos salamander (San Marcos River Plan)	<i>Eurycea nana</i>	12/03/84
Santa Cruz long-toed salamander	<i>Ambystoma macrodactylum croceum</i>	09/28/77

FISHES 36 species

Alabama cavefish	<i>Speoplatyrhinus poulsoni</i>	09/17/82
Arizona trout	<i>Salmo apache</i>	08/20/79
Bayou darter	<i>Etheostoma rubrum</i>	09/08/83
Big Bend gambusia	<i>Gambusia gaigei</i>	09/19/84
Blue pike*	<i>Stizostedion vitreum glaucum</i>	06/29/76
Bonytail chub	<i>Gila elegans</i>	05/16/84
Clear Creek gambusia	<i>Gambusia heterochir</i>	01/14/82
Colorado squawfish	<i>Ptychocheilus lucius</i>	03/16/78
Comanche Springs pupfish	<i>Cyprinodon elegans</i>	09/02/81
Cui-ui	<i>Chasmistes cujus</i>	01/23/78
Devils Hole pupfish	<i>Cyprinodon diabolis</i>	07/15/80
Gila trout	<i>Salmo gilae</i>	01/02/79
Greenback cutthroat trout	<i>Salmo clarki stomias</i>	11/11/77
Humpback chub	<i>Gila cypha</i>	08/22/79
Kendall Warm Springs dace	<i>Rhinichthys osculus thermalis</i>	07/12/82
Leopard darter	<i>Percina pantherina</i>	09/20/84
Maryland darter	<i>Etheostoma sellare</i>	02/02/82
Moapa dace	<i>Moapa coriacea</i>	02/14/83
Mohave tui chub	<i>Gila bicolor mohavensis</i>	09/12/84
Okaloosa darter	<i>Etheostoma okaloosae</i>	10/23/81
Owens River pupfish	<i>Cyprinodon radiosus</i>	09/17/84
Pahrump killifish	<i>Empetrichthys latos</i>	03/17/80
Pecos gambusia	<i>Gambusia nobilis</i>	05/09/83
San Marcos River Plan		12/03/84
Fountain darter	<i>Etheostoma fonticola</i>	
San Marcos gambusia	<i>Gambusia georgei</i>	
Slackwater darter	<i>Etheostoma boschungii</i>	03/08/84
Slender chub	<i>Hybopsis cahnii</i>	07/29/83
Snail darter	<i>Percina tanasi</i>	05/05/83
Spotfin chub	<i>Hybopsis monacha</i>	11/21/83
Topminnows		03/15/84
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	
Yaqui topminnow	<i>Poeciliopsis occidentalis sonoriensis</i>	
Unarmored threespine stickleback	<i>Gasterosteus aculeatus williamsoni</i>	12/27/77
Warm Springs pupfish	<i>Cyprinodon nevadensis pectoralis</i>	11/10/76
Watercress darter	<i>Etheostoma nuchale</i>	06/25/80
Woundfin	<i>Plagopterus argentissimus</i>	07/09/79
Yellowfin madtom	<i>Noturus flavipinnis</i>	06/23/83

SNAILS 7 species

Chittenango ovate amber snail	<i>Succinea chittenangoensis</i>	03/24/83
Flat-spined three-toothed snail	<i>Triodopsis platysayoides</i>	05/09/83
Iowa Pleistocene snail	<i>Discus macclintocki</i>	03/22/84
Noonday snail	<i>Mesodon clarki nantahala</i>	09/07/84
Painted snake coiled forest snail	<i>Anguispira picta</i>	10/14/82
Stock Island tree snail	<i>Orthalicus reses</i>	03/08/83
Virginia fringed mountain snail	<i>Polygyriscus virginianus</i>	05/09/83

CLAMS 14 species

Appalachian moneyface pearly mussel	<i>Quadrula sparsa</i>	07/09/84
Birdwing pearly mussel	<i>Conradilla caelata</i>	07/09/84
Cumberland bean pearly mussel	<i>Villosa trabalis</i>	08/22/84
Cumberland monkeyface pearly mussel	<i>Quadrula intermedia</i>	07/09/84
Dromedary pearly mussel	<i>Dromus dromas</i>	07/09/84
Fine-rayed pigtoe pearly mussel	<i>Fusconaia cuneolus</i>	09/19/84
Green-blossom pearly mussel	<i>Epioblasma torulosa gubernaculum</i>	07/09/84
Higgins' eye pearly mussel	<i>Lampsilis higginsii</i>	07/29/83
Orange-footed pearly mussel	<i>Plethobasus cooperianus</i>	08/30/84
Pale lilliput pearly mussel	<i>Toxolasma cylindrella</i>	08/22/84

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Endangered and Threatened Species Having Recovery Plans

Common Name	Scientific Name	Date Plan Approved
Rough pigtoe pearly mussel	<i>Pleurobema plenum</i>	08/06/84
Shiny pigtoe pearly mussel	<i>Fusconaia edgariana</i>	07/09/84
Tan riffle shell mussel	<i>Epioblasma walkeri</i>	10/22/84
White wartyback pearly mussel	<i>Plethobasus cicatricosus</i>	09/19/84
CRUSTACEANS 1 species		
Socorro isopod	<i>Thermosphaeroma thermophilus</i>	02/17/82
INSECTS 9 species		
Two California butterflies		10/10/84
San Bruno elfin butterfly	<i>Callophrys mossii bayensis</i>	
Mission blue butterfly	<i>Icaricia icarioides missionensis</i>	
Kern primrose sphinx moth	<i>Euproserpinus euterpe</i>	02/08/84
Lange's metalmark butterfly	<i>Apodemia mormo langei</i>	03/21/80
(Antioch Dunes Plan)		
Oregon silverspot butterfly	<i>Speyeria zerene hippolyta</i>	09/22/82
Palos Verdes blue butterfly	<i>Glaucopsyche lygdamus palosverdesensis</i>	01/19/84
Schaus swallowtail butterfly	<i>Papilio aristodemus ponceanus</i>	11/17/82
Smith's blue butterfly	<i>Euphilotes enoptes smithi</i>	11/09/84
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	08/01/84
PLANTS 33 species		
Antioch Dunes Plan		03/21/80
Contra Costa wallflower	<i>Erysimum capitatum</i> var. <i>angustatum</i>	
Antioch Dunes evening primrose	<i>Oenothera deltoides</i> ssp. <i>howellii</i>	
Bunched arrowhead	<i>Sagittaria fasciculata</i>	09/08/82
Channel Islands Plan		01/26/84
San Clemente Island broom	<i>Lotus dendroideus</i> ssp. <i>traskiae</i>	
San Clemente Island bush-mallow	<i>Malacothamnus clementinus</i>	
San Clemente Island Indian paintbrush	<i>Castilleja grisea</i>	
San Clemente Island larkspur	<i>Delphinium kinkiense</i>	
Chapman's rhododendron	<i>Rhododendron chapmanii</i>	09/08/83
Clay phacelia	<i>Phacelia argillacea</i>	04/12/82
Davis' green pitaya	<i>Echinocereus viridiflorus</i> var. <i>davisii</i>	09/20/84
Eureka Valley Dunes plants		12/13/82
Eureka Valley dunegrass	<i>Swallenia alexandrae</i>	
Eureka Valley evening-primrose	<i>Oenothera avita</i> ssp. <i>eurekaensis</i>	
Furbish lousewort	<i>Pedicularis furbishiae</i>	06/30/83
Green pitcher plant	<i>Sarracenia oreophila</i>	05/11/83
Gypsum wild buckwheat	<i>Eriogonum gypsophilum</i>	03/30/84
Hairy rattlesnake	<i>Baptisia arachnifera</i>	03/19/84
Harper's beauty	<i>Harperocallis flava</i>	09/13/83
Hawaiian vetch	<i>Vicia menziesii</i>	05/18/84
McDonald's rock-creep	<i>Arabis mcdonaldiana</i>	02/28/84
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	03/30/84
Mountain golden heather	<i>Hudsonia montana</i>	09/14/83
Navasota ladies'-tresses	<i>Spiranthes parksii</i>	09/21/84
Nellie cory cactus	<i>Coryphantha minima</i>	09/20/84
Northern monkshood	<i>Aconitum noveboracense</i>	09/23/83
Peebles Navajo cactus	<i>Pediocactus peeblesianus</i> var. <i>peeblesianus</i>	03/30/84
Persistent trillium	<i>Trillium persistens</i>	03/27/84
Raven's manzanita	<i>Arctostaphylos pungens</i> var. <i>ravenii</i>	07/10/84
Robbins' cinquefoil	<i>Potentilla robbinsiana</i>	07/22/83
San Diego mesa mint	<i>Pogogyne abramsii</i>	07/10/84
Tennessee purple coneflower	<i>Echinacea tennesseensis</i>	02/14/82
Texas wild-rice (San Marcos River Plan)	<i>Zizania texana</i>	12/03/84
Truckee barberry	<i>Mahonia sonnei</i>	06/20/84
Virginia round-leaf birch	<i>Betula uber</i>	03/03/82

*Recovery efforts did not come in time to save this fish; it was recognized by the Service as extinct on September 2, 1983.

Plans for Cacti

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tober 30, 1979, as a Threatened species.

Energy development in the Four Corners region of the southwest has had a serious impact on the cactus and its habitat. In one case, a large coal-fired power plant was built on Mesa Verde cactus habitat in New Mexico. Powerlines running from this and other generating plants in the area already have been built through most of the species' populations in New Mexico. The potential for oil and gas drilling, along with pipeline construction, on Mesa Verde cactus habitat also is high. Given the emphasis on energy exploration and exploitation in the region, it is likely that increasing coal, oil, gas, and uranium development will make the conservation of endemic cacti even more difficult.

With the push for energy production, the human population in northwestern New Mexico is expected to increase and create additional impacts on the cactus. Residential and commercial development, road building and maintenance, and recreational use have already been observed in or near the species' habitat. In fact, the growing use of off-road vehicles (ORVs), particularly motorcycles and four-wheel drive units, is cited in the recovery plan as one of the greatest threats to the species' survival. Two populations of the cactus in northwestern New Mexico are already suffering high damage from ORVs, and vehicular recreation throughout much of the species' range is increasing rapidly.

Illegal collecting of *Sclerocactus mesae-verdae* plants and their seeds, either by hobbyists or by commercial dealers, also is affecting wild populations of the cactus, although the extent is hard to determine. Botanists have revisited some monitored populations and found them decimated. Very few have mature plants—another sign of collecting. Because the cacti grow so slowly and have such a low reproductive success rate, the occasional take of a few plants can deplete or even extirpate a population. Ironically, since the Mesa Verde cactus is difficult to grow in cultivation, as many as 90 percent of the plants taken from the wild may rot and die within a year.

Recovery Actions

The primary objective of the *Mesa Verde Cactus* (*Sclerocactus mesae-verdae*) *Recovery Plan* is to restore the species to a secure status by removing current and potential future threats to the five known populations and their habitat. Vigorous law enforcement and the full exercise of existing conservation authorities (see following story) may go

a long way toward securing the future of the Mesa Verde cactus.

Habitat conservation on federally-administered lands is required under Section 7 of the Endangered Species Act (ESA). At least 70 percent of the Mesa Verde cacti are on lands within the Navajo Indian Reservation, and another 20 percent are on the Ute Mountain Indian Reservation. Federal activities on both reservations are administered through the Bureau of Indian Affairs (BIA). The remaining plants are on Bureau of Land Management (BLM), State of New Mexico, or private lands. Any construction through BIA or BLM-managed land that is potential habitat for the Threatened cactus is subject to the approval of these Federal agencies and to the Section 7 consultation process.

Although development of new energy projects currently is not a major threat to the Mesa Verde cactus, careful monitoring of future activities will be needed. Prior to exploration for coal, oil, and gas, or construction of pipelines and powerlines, potential habitat should be surveyed and anticipated impacts evaluated. In many cases, it may be possible, through careful planning, to minimize or prevent most adverse impacts of energy production and distribution.

In addition to working with other Federal agencies, the Service plans to seek cooperative agreements with private landowners, as well as with the Navajo and Ute Mountain Tribes, for securing the cactus and its habitat from potentially harmful effects of construction, agriculture, and recreation. In particular, the Navajo Nation will be encouraged to regulate ORV use on known Mesa Verde cactus habitat within its reservation. It may be that ORV activity can be diverted to less sensitive areas.

The problems of collection and trade in the Mesa Verde cactus are addressed in several Federal laws. Regulations being developed to implement the 1982 Endangered Species Act Amendments will make it illegal to remove and reduce to possession any Threatened plant from federally administered lands without a permit. Interstate and international trade in this species is restricted, except under permit, by the ESA, the Lacey Act, and the Convention on International Trade In Endangered Species of Wild Fauna and Flora (CITES).

Along with the increased enforcement of existing conservation laws, the recovery plan calls for additional surveys of potential habitat within the Four Corners region to determine whether or not there are other populations of the cactus. Any newly discovered populations should be mapped and appropriate conservation measures initiated. Concur-

rent with the surveys, additional studies on the species' population biology and ecology should proceed. Research on insects that pollinate and, in other cases, attack the cacti is needed. Another factor deserving scrutiny is the plant's low reproductive success rate. It is estimated that fewer than one percent of *S. mesae-verdae* seeds germinate, and the number of young plants that survive to seed-bearing size is unknown. Data gained during these studies could help to increase the success of raising Mesa Verde cacti in cultivation as a possible means of relieving the collection pressure on wild populations.

* * *

Pediocactus peeblesianus var. *Peeblesianus* (Peebles Navajo cactus)

Many of the threats facing *Sclerocactus mesae-verdae* also jeopardize *Pediocactus peeblesianus* var. *peeblesianus*, a variety that is even fewer in number and more restricted in range. Only five small populations totaling approximately 1,000 Peebles Navajo cacti are known to occur, and they are restricted to an area about 7 miles long and about a mile wide near Holbrook, Arizona. It is possible, however, that surveys of potential habitat in the vicinity could locate more plants.

Gravel quarrying is destroying much of the habitat and constitutes the most immediate threat to the Peebles Navajo cactus. More than 70 percent of the potential habitat and three of the known population sites are on privately-owned land. An unknown portion of the presumed original habitat, perhaps 25 percent, has already been lost, and gravel pit operations in the area are continuing. Since some of the private land is owned by a realty company, the potential use of cactus habitat for housing construction is another serious threat. The town of Holbrook is expanding rapidly, and some of the areas where Peebles Navajo cacti grow are considered prime development property. As is the case with the Mesa Verde cactus, the Peebles Navajo cactus and its habitat also have suffered serious adverse effects from ORV use, cattle grazing, road construction, and illegal collecting. In recognition of these threats, and of the plant's continuing decline toward extinction, the Service listed *Pediocactus peeblesianus* var. *peeblesianus* on October 26, 1979, as Endangered.

Recovery Actions

According to the criteria established in the *Peebles Navajo Cactus* (*Pediocactus peeblesianus* var. *peeblesianus*) continued on page 8

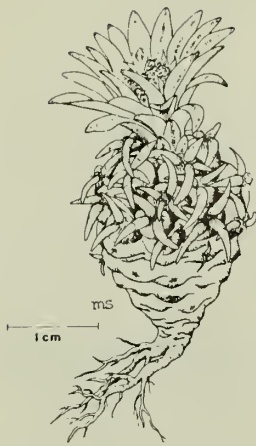


Photo by Kenneth D. Heil



under the ESA, Lacey Act, and CITES. Better enforcement of these laws is advocated in the plan.

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Nellie cory cactus (*Coryphantha minima*) and Davis' green pitaya (*Echinocereus viridiflorus* var. *davisii*)

Probably the two most vulnerable cacti in the U.S. are the Nellie cory cactus and Davis' green pitaya. Each is known only from one site, a mineral outcropping near the town of Marathon in Brewster County, Texas. The threat to the survival of the cactus is overcollection from the wild.

Davis' green pitaya apparently is restricted to a single novaculite ridge, and the population is scattered over an area that measures only about 50 meters by 4 kilometers. The Nellie cory cactus also is in a vulnerable position; two populations of this species are distributed unevenly over several low ridges in an area measuring only about 50 meters by 11 kilometers. All of the cacti are on ranchland owned by two individuals. Although this part of the northern Chihuahua Desert consists of dry grasslands used for grazing, livestock seldom wanders onto the ridges and trampling is not a major threat to either cactus.

But overcollecting is. For many hobbyists who specialize in rare cacti, having a Davis' green pitaya and Nellie cory cactus is considered a "must." The plants are not unusually showy, but they are prized for their rarity. Many European, Japanese, and American collectors know the exact location of the single population, and the site was heavily collected by some California growers about 20 years ago. Because the Nellie cory cactus and Davis' green pitaya are found together, commercial collectors were able to exploit both at the same time. It is not known whether the plants are now being taken in significant numbers, but they remain vulnerable. Federal laws do not prohibit the take of Endangered plants on private lands.

Recovery Actions

Separate recovery plans were developed for each cactus but, because they are on the same or adjacent habitat, implementation will be nearly identical. The criteria for knowing when the two cacti have in fact recovered have not yet been determined, but they should become clearer after research called for in the recovery plans is conducted. In the meantime, several important tasks have been identified.

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Often only the very tops of Peebles Navajo cacti (*Pediocactus peeblesianus* var. *peeblesianus*) protrude above ground level, and they may retract completely into the soil during dry weather. It is during periods of wetter weather, when the plant tips are emergent, that they are most vulnerable.

Plans for Cacti

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Recovery Plan, the cactus may be considered secure when all existing populations are given long-term protection, the number of known plants reaches 10,000, and the collecting of wild plants is curtailed.

About 30 percent of the potential Peebles Navajo cactus habitat is administered by BLM and the Arizona State Land Department. In fact, two of the five known populations are on BLM land. The recovery plan calls for BLM to develop regulations permanently closing known and potential habitat it manages to ORV use. It also recommends that all Peebles Navajo cactus habitat on Federal lands be removed from all forms of mineral activity, including gravel and sand quarrying. Grazing livestock can harm cactus populations by trampling emergent plants during wet seasons, and BLM has developed a habitat management plan that addresses this problem. An important part of the plan will be an "exclosure area" for the largest concentration of the cactus on BLM land. Cattle will be fenced out of this critical area, and it is hoped that the fence will control ORV use as well. BLM also is writing an environmental impact statement on grazing in this area.

A powerline access road across the populations on BLM land, which currently provides access for collectors and ORV enthusiasts, also is recommended for closure to all but official use.

Since about 70 percent of the known and potential Peebles Navajo cactus habitat is on private property, where Federal and State agencies lack the au-

thority they have on public lands, it is vital to receive landowner cooperation. With the assistance of The Nature Conservancy or State agencies, it may be possible to negotiate agreements for cooperative management of important cactus habitat. Once some type of agreement is reached, a habitat management plan should be developed for each population.

The kind of habitat conservation and management needed to sustain healthy, vigorous populations of the Peebles Navajo cactus requires an in-depth knowledge of its ecological requirements. For example, there is the question of why the cactus is known to occur on only 15 to 20 percent of its apparently suitable habitat. (One possibility is that additional searches for the plant on unsurveyed land, a task recommended in the plan, could locate more of the cacti.) Another area for study is the impact of various biotic factors, such as pollinators and herbivores. Population biology research could determine minimum and optimum numbers of plants needed to maintain healthy populations.

If effective propagation techniques can be developed, and ecological requirements determined, the Service will consider reintroducing nursery-grown stock into depleted natural habitat. Data gained on propagation of the Peebles Navajo cactus could be provided to growers as a means of satisfying the demand for this plant.

Regular monitoring is necessary not only to identify and manage threats to the habitat but to measure population trends and to quantify losses. Collecting the Peebles Navajo cactus without a permit is prohibited by the Arizona Native Plant Law and, on Federal lands, by the ESA. Trade controls are authorized

Plans for Cacti

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First, existing trade regulations authorized under ESA, CITES, and the Lacey Act should be enforced as thoroughly as possible. This would probably require a major study of all listed cacti that are in trade in order to determine the extent and impact of commercialization. The establishment of monitoring sites on the habitat could quantify any continuing losses to collectors.

Without the support of the two private landowners, recovery of the Nellie cory cactus and Davis' green pitaya will be impossible. Once the Service gains the cooperation and good will of both individuals, it will seek to negotiate management agreements for the protection of the cacti and their habitat. Such an agreement should allow designated re-

searchers access to the habitat for monitoring the known populations and for surveying nearby potential habitat. (The property is already fenced, and one part of the recovery plan calls for adding "no trespassing" signs, putting them far enough along the fenceline to avoid pinpointing the populations.) If possible, and if found to be appropriate, the agreement should also allow for some management to enhance existing habitat.

Any habitat management authorized by the landowners will occur only after sufficient research on the population biology and ecology of the cacti. More needs to be known about microhabitat characteristics, pollination vectors, overall reproductive potential, and natural population limiting factors. Such information could be helpful not only in conserving the existing populations, but possibly also in facilitating commercial propagation.

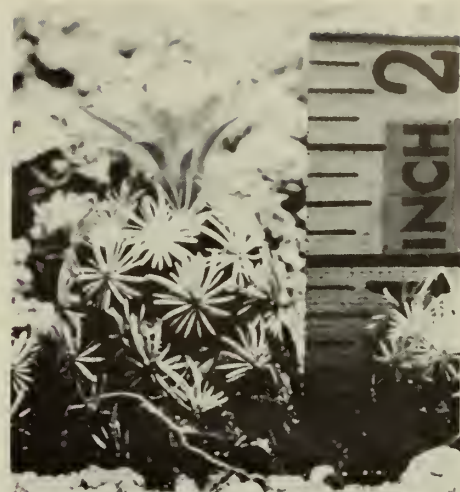


Photo by Del Weniger

Another miniature, the Nellie cory cactus (*Coryphantha minima*), reaches only up to 2.5 cm in stem height, and is distinguished by its thick, non-tapering spines.

Controlling the Take of Rare Cacti

Whether for their beauty, their unique appearance, or their rarity, the demand for many native cacti has been increasing rapidly. Under the Endangered Species Act, it is illegal to "remove and reduce to possession" Endangered and Threatened cacti and other plants from lands under Federal jurisdiction. Some States also have their own laws restricting the take of native plants. It is difficult, however, to adequately enforce these measures, particularly in remote areas. Controlling commercial trade, then, is necessary to help reduce the drain on wild populations.

The Endangered Species Act prohibits interstate and international sale or export of Endangered and Threatened plants, except under permit. Endangered species permits can be obtained only for scientific research or for purposes that will enhance the propagation or survival of the species in the wild. Threatened species permits can be obtained for the same purposes and for the purpose of education. Seeds and cuttings of Endangered plants are included under the ban, but trade in seeds of commercially propagated Threatened species is allowed. Nursery owners must obtain permits from the Federal Wildlife Permit Office in order to sell propagated stocks of listed species.

Another law, the Lacey Act, gives Federal support to State conservation regulations. Since 1981, it has prohibited interstate trade or export of native wild plants collected or possessed in violation of laws of the State of origin. In

the case of cacti, this provision applies to Arizona, New Mexico, Texas, California, and Nevada, all of which have laws that regulate cactus collecting. The Lacey Act's heaviest penalties are for commercial dealers who intentionally violate State laws, but individual hobbyists must also comply. Propagators approved by the States are not affected.

All four of the cacti discussed in this month's recovery plan summary (along with 31 others) are on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an international treaty that controls export and import of rare species. Under CITES, exports from the U.S. of Appendix I cacti are approved only when the importing country has issued an import permit and when the U.S. Fish and Wildlife Service finds that the export will not be detrimental to the species (and issues its own permit). Only trade for primarily non-commercial purposes is allowed.

As a precaution, all other members of the family Cactaceae are included on Appendix II of CITES. Appendix II includes species that are not necessarily threatened at present, but could become so if trade is not regulated. Commercial trade in Appendix II cacti is allowed, but only after the country of export has determined that it will not harm wild populations and issues a permit.

CITES seeks to promote legitimate nursery propagation of plants for sale to

collectors without harming wild populations. For this reason, CITES regulations for trading artificially propagated plants are more lenient. International trade in artificially propagated Appendix I species does not require previous issuance of a CITES import permit by the importing country, and artificially propagated Appendix II plants are freely traded under Certificates of Exemption granted by the Service.

When a species is listed under both the Endangered Species Act and CITES, the terms of both must be obeyed. Normally, the Act applies the more stringent controls.

* * *

Better enforcement of the conservation laws is advocated in each of the cactus recovery plans. Determining the current extent of trade, both legal and illegal, may involve monitoring sale catalogs, visiting nurseries, and possibly some undercover work. Such an effort should be national in scope and address all protected cacti.

Although some hobbyists may insist on field-collected plants, many others enjoy raising nursery-produced seeds and seedlings; therefore, an artificial propagation program may remove some of the collecting pressure. Service participation in such an effort, perhaps as part of a comprehensive cactus trade management plan, is under consideration. First, however, a number of economic, legal, and biological uncertainties need to be addressed in order to determine if properly regulated commercialization will significantly aid in the recovery of rare cacti.

Regional Briefs

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with 13 present on the Bosque del Apache National Wildlife Refuge.

Including the captive population of 35 cranes (32 at the Service's Patuxent Wildlife Research Center in Laurel, Maryland, 2 at the San Antonio Zoo in Texas, and 1 at the International Crane Foundation in Baraboo, Wisconsin), there were a total of 148 whooping cranes surviving at the end of 1984.

The 1985 Crane Workshop will be held in Grand Island, Nebraska, on March 26-29, 1985, where more than 60 papers will be presented regarding crane research and management. Participants will observe cranes along the Platte River and will also visit the Rainwater Basin to see crane habitat.

Ms. Heather Stout has joined Region 2's endangered species staff as a listing botanist. Ms. Stout was formerly with the Service's Sacramento Endangered Species Field Office in California.

Region 3—A Conservation Agreement for the Illinois mud turtle (*Kinosternon flavescens spooneri*) is being circulated for signatures. The agreement, which is among the States of Illinois, Iowa, and Missouri, the Fish and Wildlife Service (FWS), a chemical company, and an electric company, will endeavor to ensure the well-being of this turtle. The Service proposed it for listing in 1978, but later decided that it is a disjunct population of the yellow mud turtle and the proposal was withdrawn. The Illinois mud turtle is listed by the States of Illinois and Missouri as endangered, and listed as rare in Iowa.

Region 4—The body of a record 3,090-pound West Indian manatee (*Trichechus manatus*) was recovered near Lake Okeechobee, Florida, by Service researchers on November 20, 1984. The 12-foot, 4-inch female manatee, pregnant with a 39-inch fetus, was killed by a boat collision, as evidenced by 8 large, deep wounds on its lower dorsum. These wounds penetrated to the spine and shattered several vertebrae. The average size of adult manatees recovered by the Service's carcass salvage program is approximately 1000 pounds.

A female Florida panther (*Felis concolor coryi*) was killed by a tractor-trailer truck on State Road 84 in south Florida on November 18, 1984. This incident, the seventh known road kill since 1972, further endangered the small remaining panther population and highlighted the

ongoing controversy surrounding a proposal to upgrade State Road 84 to an interstate highway. The Jacksonville Endangered Species Field Office recently entered into formal Section 7 consultation with the Federal Highway Administration regarding the project. The highway, popularly known as Alligator Alley, extends from Fort Lauderdale on the Atlantic Coast across south Florida to Naples on the Gulf Coast. Other Endangered and Threatened species potentially impacted by this project include the American alligator (*Alligator mississippiensis*), wood stork (*Mycteria americana*), Everglade (snail) kite (*Rostrhamus sociabilis plumbeus*), bald eagle (*Haliaeetus leucocephalus*), Arctic peregrine falcon (*Falco peregrinus tundrius*), red-cockaded woodpecker (*Picoides borealis*), and eastern indigo snake (*Drymarchon corais couperi*).

The primary impacts that this project may have on the panther are habitat fragmentation and an increased potential for road kills. The principal structural feature that has been discussed in connection with upgrading the road to interstate status is a series of wildlife crossings placed at intervals across the western two-thirds of the highway. Locations for the wildlife crossings have been based principally on the occurrence of physical features on either side of the roadway that are most likely to facilitate panther movements and crossing areas documented by a 3-year radio-telemetry project.

On December 4, 1984, the Jacksonville Endangered Species Field Station botanist met with representatives from ITT-Rayonier and the Georgia Department of Natural Resources' Plant Protection Program to discuss ITT-Rayonier's timber management practices in the pinelands of southeastern Georgia.

The pinelands, predominantly slash pine (*Pinus elliotti*) with some long leaf pine (*P. palustris*), are the site of the Endangered *Baptisia arachnifera* (hairy rattleweed). Hairy rattleweed, a robust perennial legume, is scattered over a 125-square mile area, and is restricted to relatively dry, open pine-palmetto woods. Most of this habitat is currently pine plantation managed for pulpwood. ITT-Rayonier's site preparation includes chopping, bedding, and burning. It appears that ITT-Rayonier's techniques do not affect population densities and may even enhance growing conditions by preventing shrubs from invading and shading out the hairy rattleweed.

The Service has received a status survey report on the cave crayfish (*Cambaras zophonastes*), conducted

under contract by Arkansas Natural Heritage Commission biologists. This rare troglobite was found in only one cave out of more than 50 caves that contain similar habitat. The Service's Jackson, Mississippi, Field Station will conduct a status review to determine if this crayfish should be protected.

The Yale School of Forestry (YSF) inaugurated its Tropical Resources Institute in Puerto Rico in the summer of 1984 to provide research opportunities for YSF candidates for masters and doctoral degrees. Although most research projects involve forestry, some are wildlife oriented. Two projects conducted on Mona Island this summer are relevant to the Service's Endangered Species Program. Ms. Molly Olsen gathered comprehensive data on hawksbill turtle (*Eretmochelys imbricata*) nesting on Mona, and the Service is encouraging continuation of this project in coming years. Ms. Jennifer Hoaser studied goat populations on the island and their potential impacts on Mona ground iguana (*Cyclura stejnegeri*) populations. Her findings point the way for some future research and management efforts.

YSF is coordinating closely with the Commonwealth of Puerto Rico's Department of Natural Resources, the Service, and other Federal and Commonwealth agencies. Mr. John Hoffnagel, program director in Puerto Rico, met with the Caribbean Islands Field Supervisor for Endangered Species and Habitat Resources to discuss possible projects relating to Service programs. Potential projects include biological monitoring of the yellow-shouldered blackbird (*Agelaius xanthomus*), implementation of the Mona ground iguana recovery program, continued research on hawksbill turtles on Mona Island, and surveys of mangrove and *Podocarpus* forests.

An initial field survey of the recently designated Alligator River National Wildlife Refuge in North Carolina was conducted to determine the area's suitability for a possible red wolf (*Canis rufus*) introduction effort. Much more work needs to be done, but the area does hold promise from a biological standpoint. Small mammal and feral canid surveys will be conducted this winter.

Region 5—The Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*), placed on the Endangered species list in 1980, will now be protected on its very own national wildlife refuge under a cooperative agreement that was formally established on October 22, 1984, by the Fish and Wildlife Service, the

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Massachusetts Office of Environmental Affairs, and the Massachusetts Division of Fisheries and Wildlife. The agreement, authorized by the Endangered Species Act, permits joint management of the Massasoit National Wildlife Refuge (NWR) in Plymouth County, Massachusetts, but the Division of Fisheries and Wildlife will continue with its lead role in the protection and recovery of the turtle.

Massasoit NWR, established in September 1983, is among the newest in a network of over 400 refuges encompassing nearly 90 million acres across the country. The 182-acre refuge lies within Critical Habitat of the Plymouth red-bellied turtle and includes two of the 15 ponds that contain all of the 250 turtles that remain. The principal threats to the turtle are loss of habitat and habitat disturbance.

* * *

Region 6—The Wyoming Natural Area Needs Workshop was held at Central Wyoming College in Riverton on November 14 and 15. Nearly 100 scientists, planners, and managers from 10 States attended the workshop, which was sponsored by The Nature Conservancy, the Forest Service, the Bureau of Land Management, and the Fish and Wildlife Service. This was the first time that experts from so many disciplines met to discuss the conservation needs unique to Wyoming.

* * *

Region 7—One of the highlights of the recent Aleutian Canada Goose Recovery Team meeting was the identification of Amchitka Island as the next location to receive transplanted geese from Buldir. Last summer, it was confirmed that small numbers of Aleutian geese (*Branta canadensis leucopareia*) were nesting on Agattu Island, which has been the focus of transplant efforts since 1980.

Amchitka, once a pristine wilderness and important breeding site for the Aleutian Canada goose, has twice been disturbed by man: first, through the introduction of Arctic foxes for the fur trade in the 19th and early 20th centuries, and more recently by the Atomic Energy Commission, which conducted underground atomic weapons testing there in the 1960s and 1970s. The first event resulted in the extirpation of the Aleutian goose from this remote, 73,000-acre island. Now, man is again intervening on Amchitka. Arctic foxes have been removed and the island is once more safe for nesting waterfowl. If a spring survey on Agattu Island confirms that a viable population of geese has been reestablished there, recovery efforts will turn to Amchitka, where wild family groups of geese will be transplanted this summer from the main colony at Buldir.

CITES News

Service Announces Proposals for Changes in CITES Appendices

The Endangered Species Act of 1973, as amended in 1979, designates the Secretary of the Interior as both the Management Authority and the Scientific Authority of the United States, for the purposes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Management Authority responsibilities are delegated to the Associate Director—Federal Assistance; Scientific Authority responsibilities are delegated to the Associate Director—Research.

The Service's Wildlife Permit Office (WPO) functions as staff to the U.S. Management Authority for CITES, assuring that wildlife and plants are exported or imported in compliance with laws for their protection and issuing permits for legal trade of these species. The Service's Office of the Scientific Authority (OSA) functions as staff to the U.S. Scientific Authority for CITES. OSA reviews applications to export and import species protected under CITES, reviews the status of wild animals and plants impacted by trade, makes certain findings concerning housing and care of protected specimens, and advises on trade controls.

The Service has been evaluating biological and trade information on a number of animal and plant candidates for U.S. proposals to amend CITES Appendices I and II at the next biennial meeting of Party nations, now scheduled for April 1985 in Buenos Aires, Argentina. On September 7, 1984, the Service's Office of Scientific Authority published a *Federal Register* notice calling for information regarding possible CITES amendments. After evaluating the comments received on various candidates, the Service has decided (F.R. 12/14/84) to propose CITES amendments for the following species:

- northern elephant seal (*Mirounga angustirostris*)—The National Marine Fisheries Service (U.S. Department of Commerce) suggested that

this marine mammal be considered for removal from Appendix II on the grounds that it is no longer threatened or in trade. The Service agrees with this proposal.

- red-kneed tarantula (*Brachypelma smithi*)—This large ground-dwelling spider from arid western Mexico is collected for the U.S. and western Europe pet trade. The Environmental Defense Fund advocates including this tarantula on Appendix II, and the Service will make the proposal at the next CITES meeting.
- cycad plants (*Ceratozamia* spp.)—All cycad taxa are now on CITES Appendix I or II. TRAFFIC (U.S.A.), a program of the World Wildlife Fund-U.S., proposed transferring the cycad genus *Ceratozamia* from Appendix II to Appendix I. About eight species are recognized in this genus; all but one are confined to Mexico, the other is in Guatemala. TRAFFIC (U.S.A) quotes a Mexican authority as reporting that species of this commercially valuable genus are threatened with extinction due to collection and habitat destruction. The U.S. will propose the transfer.
- parts and derivatives of Appendix II plants—For plants on CITES Appendices II and III, only those parts and derivatives specified in the Appendices are subject to CITES regulation. A recent resolution by CITES Parties recommended that trade in *all* parts and derivatives of Appendix II or III plants be regulated unless particular ones are specifically exempted. After a review of subsequent comments, the Service agrees with proposing the inclusion of all readily recognizable parts and derivatives except for those specified in the December 14, 1984, *Federal Register*.

Call for Information on Endangered Species Impacts From Pesticides

Under contract to the President's Council on Environmental Quality, the Center for Environmental Education (CEE) is reviewing the Environmental Protection Agency's compliance with the Endangered Species Act, particularly with respect to its implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). As part of the review, CEE is seeking information

concerning the injury or death of Endangered or Threatened animals or plants in connection with the use of chemicals controlled by FIFRA. Individuals with information concerning such incidences, or who are otherwise interested in this review, are urged to write Roger E. McManus, Executive Director, Center for Environmental Education, 624 9th Street, N.W., Washington, D.C. 20001.

Status Review on Five Animals

The Service has announced (F.R. 12/18/84) that four recent petitions to list five animals as Endangered presented substantial information that such listings may be warranted; therefore, it has initiated status reviews on the following:

- woodland caribou (*Rangifer tarandus caribou*)—Douglas H. Chadwick provided evidence that this animal occurs, at least occasionally, in northwestern Montana, and that it is likely to be facing the same threats confronting the Endangered southern Selkirk Mountain herd that occurs to the west.
- Coeur d'Alene salamander (*Plethodon vandykei idahoensis*)—Data provided by Thomas P. Koenigs suggest a severe recent decline in the numbers and distribution of this amphibian, due primarily to human-related habitat disruption. The salamander occurs in parts of Idaho and Montana.
- gopher tortoise (*Gopherus polyphemus*)—Drs. Ren Lohofener and Lynn Lohmeier provided extensive evidence that tortoise populations are declining drastically because of killing and habitat destruction. Their petition recommended listing those gopher tortoise populations occurring west of the Tombigbee River in Alabama, Louisiana, and Mississippi as Endangered. A status review on this species throughout its entire range was already underway, however, as it was included in the Service's "Notice of Review of Vertebrate Wild-

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	19	19	233	4	0	22	297	21
Birds	59	13	144	3	1	0	220	52
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	29	4	11	14	3	0	62	36
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	14
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	4	0	0	12	9
Plants	67	5	1	9	2	2	85	33
TOTAL	224	47	460	51	10	37	829	195**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 164

Number of species currently proposed for listing: 32 animals
36 plants

Number of Species with Critical Habitats determined: 67

Number of Cooperative Agreements signed with States: 41 fish & wildlife
14 plants

December 31, 1984

life," published in the December 30, 1982, *Federal Register*.

- Barbara Anne's tiger beetle (*Cicindela politula barbaraannae*) and the Guadalupe Mountains tiger beetle (*C. p. ssp.*)—A petition from W.D. Sumlin III and Christopher D. Nagano furnished commercial trade information suggesting that overcollecting is jeopardizing both subspecies. Fanciers of rare insects seem willing to pay high prices for these colorful Texas beetles. More-

over, the apparently small natural distribution and numbers of these subspecies make them particularly vulnerable to extinction.

The Service requests any data on distribution, numbers, systematics, threats, and possible Critical Habitat regarding these species. Information may be submitted until further notice, and all data received will be evaluated before the Service decides whether or not to formally propose their listing as Endangered or Threatened.

January 1985

Vol. X No. 1

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Listings Made Final for Two Mammals

Two mammals were listed as Endangered during January 1985. The Fresno kangaroo rat survives only in a small area of native grasslands in California's San Joaquin Valley, and the cochito (or Gulf of California harbor porpoise) apparently has not even been seen in at least 4 years. Both mammals are now recognized by the Service as being in danger of extinction.

Fresno kangaroo rat

The main problem facing the Fresno kangaroo rat (*Dipodomys nitratoides exilis*) is habitat alteration and destruction. This hopping mammal, the smallest of California's kangaroo rats, has very restrictive habitat requirements. It must have a land surface with hummocks as sites for its extensive, but shallow burrow systems, and a substrate of suitable compactness to permit burrow construction. A relatively dense growth of vegetation is needed for escape from predators and for a source of food. Unlike some rodents, the Fresno kangaroo rat is not known to use areas that have been cultivated or irrigated. Historically, the animal's range probably included about 250,000 acres of the San Joaquin Valley.

By 1938, extensive conversion of native grasslands for agricultural development had reduced suitable habitat to about 100,000 acres. From 1938 to April 1981, approximately 90 percent of those 100,000 acres were lost to agricultural uses. Next, just in the period from April to November of 1981, 34 percent of the small amount of remaining habitat was eliminated. Loss of additional areas could happen at any time, and most of the native grasslands that do still exist are being damaged by livestock grazing. Grazing can adversely modify the habitat by reducing escape cover and reducing the food plant supply. Livestock can also directly damage the shallow burrows.

As much as about 6,417 acres of potentially suitable habitat still remain, but most has badly deteriorated because of heavy grazing, and may be converted to cropland unless something is done.

Field studies conducted in 1981-1982 found only about 857 acres, mostly State-owned, actually occupied by the Fresno kangaroo rat.

The Fresno kangaroo rat was proposed for listing as Endangered on November 21, 1983 (see BULLETIN Vol. VIII No. 12), and the listing became final on January 30, 1985. About 857 acres in western Fresno County were designated

expanded economic analysis on designating these additional lands as Critical Habitat, the Service decided to proceed with the 857 acres in the proposed rule. A new public comment period will be announced on the State's proposal, and a decision subsequently will be made on whether or not to designate the full 4,800 acres.

Available Conservation Measures

Under Section 7 of the Endangered Species Act, Federal agencies are re-



Fresno kangaroo rat

Photo by Walt Hoffman

as Critical Habitat (see final listing rule for map). Of this land, approximately 565 acres comprise the State of California's Alkali Sink Ecological Reserve (or lands scheduled for addition to the reserve), about 20 acres are part of the State-owned Mendota Wildlife Management Area, and the remainder is privately owned. Private landowners were notified of the proposed rule but did not submit comments.

The State of California supported the listing, but recommended that about 4,800 more acres that could support the kangaroo rat be added to the designated Critical Habitat. Rather than delay the Endangered listing by carrying out an

quired to ensure that any actions they fund, authorize, or carry out will not jeopardize the survival of the Fresno kangaroo rat or adversely modify its Critical Habitat. A preliminary analysis revealed no current Federal actions that would be affected by this provision.

Among the other conservation measures authorized by the Act are prohibitions against take and interstate or international trafficking in the species without a permit, the requirement for the Service to develop a recovery plan, and the possibility of Federal funding for cooperative State endangered species programs.

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REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of January:

Region 2—A joint meeting of the Fish and Wildlife Service's (FWS) Region 2

plant recovery teams was held in Albuquerque, New Mexico, on January 10–11, 1985. Participants included representatives from the New Mexico, Arizona, Texas, and Oklahoma plant recovery teams, the regional botanical staff, and the FWS Washington Office,

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as well as guest speakers from various universities. The objectives of the meeting were to acquire information on listing candidate assessments, recovery plans, and recovery task priorities. Information on recovery guidelines, the FWS Division of Realty and its role in recovery, the biology of recovery, and CITES' relationship to the Endangered Species Act and to the recovery process was also provided. Washington Office representatives were given an opportunity to see how the region's recovery teams worked and botanists were able to compare notes. The Region 2 botanical staff anticipates having a similar meeting approximately every 2 years.

Dr. Jim Lewis, the FWS Whooping Crane Coordinator, visited the San Antonio Zoological Park recently to arrange the transfer of a pair of whooping cranes (*Grus americana*) to the FWS Patuxent Wildlife Research Center in Laurel, Maryland, to supplement the captive-breeding population there. It is hoped that this will allow the Patuxent staff to maximize the potential for this pair's egg production, as they have not produced young during their 5-year stay in San Antonio.

A whooping crane being cared for at the Rio Grande Zoological Park in Albuquerque, New Mexico, died on January 21 after undergoing surgery to repair a broken leg. Although the bird was not eating on its own initiative, it had gained weight and was recovering from avian cholera at the time. A subsequent autopsy found its liver to be badly damaged by the cholera bacteria and its kidneys enlarged.

A young whooping crane was sighted near Midfield, Texas, in late December and is being closely observed by the Texas Parks and Wildlife Department and the FWS to ensure the bird's safety. Presumably, this bird was separated from its parents during the fall migration, and it is currently staying with a group of sandhill cranes (*Grus canadensis*).

As part of a cooperative study being conducted by the George Miksch Sutton Avian Research Center, the States of Oklahoma and Florida, and the FWS, 18 bald eagle (*Haliaeetus leucocephalus*) eggs were removed from wild nests in Florida and incubated in Bartlesville, Oklahoma. The hatch rate has been excellent, with 17 chicks hatched. Tentative plans are to foster these chicks into wild nests or hack them into the wild. Possible sites include areas in the States of Alabama and Georgia, and the Sequoyah National Wildlife Refuge (NWR) in Oklahoma. Currently, a bald eagle pair is building a natural nest in Sequoyah NWR—one of the three wild nests in that State.

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Listings Made Final for Two Mammals

continued from page 1

Cochito

The cochito, or Gulf of California harbor porpoise (*Phocoena sinus*), was listed as Endangered on January 9, 1985. The marine mammal, which is similar in appearance to the common harbor porpoise (*Phocoena phocoena*), is known only from the northern third or quarter of the gulf. For more than 40 years, the cochito population has been seriously affected by incidental take during commercial gillnet fishing throughout its restricted range. Today, it is on the brink of extinction (if it even exists). No confirmed sightings of this animal at sea have been reported since 1980.

The determination that the cochito is Endangered was made by the National Marine Fisheries Service (U.S. Department of Commerce), which has Endangered Species Act responsibilities for most marine animals. For further information, contact the Protected Species Division, Office of Protected Species and Habitat Conservation, National Marine Fisheries Service, 3300 Whitehaven Street, NW., Washington, D.C. 20235.



Photo by Christine A. Flanagan

The cochito, or Gulf of California harbor porpoise, is jeopardized by incidental take during gillnet fishing operations.

Utah Plant, the Jones Cycladenia, Proposed for Listing

One of southeast Utah's rare endemic plants, Jones cycladenia (*Cycladenia humilis* var. *jonesii*), has been proposed by the Service for listing as Endangered (F.R. 1/10/85). Approximately 5,000 to 6,000 individuals are known from three populations of the plant in Emery, Garfield, and Grand Counties. The primary threat to its survival is habitat damage caused by off-road vehicles (ORVs) used for recreation and for oil, gas, and mineral exploration.

A herbaceous perennial growing 10–15 centimeters tall, Jones cycladenia bears clumps of broad, bright green leaves and rosy flowers that, according to Alice Eastwood, who described the plant, "somewhat resemble small morning-glories and have a charm that thrills the beholder." The Jones cycladenia is the only member of its genus in the Intermountain West. It occurs in the arid Canyonlands region of Utah, which is considered relatively ancient floristically and which has more endemic plants than any other part of the State (approximately 70 taxa). In addition to the *Cycladenia*, about 13 of these taxa are candidates for possible listing as Endangered or Threatened. The region's arid climate and harsh soils make its ecosystems fragile, easily degraded by surface disturbances, and slow to recover.

The largest population of Jones cycladenia occurs at two sites totalling

approximately 40 acres in the San Rafael Swell. Some 2,000 of the plants grow on public property administered by the Bureau of Land Management (BLM). A smaller population segment, only 2 miles away, numbers about 500 plants on State land. Both parts of the San Rafael Swell population are subject to damage from oil, gas, and mineral exploration activities, and the habitat is already scarred by the tracks of bulldozers, trucks, and motorcycles. Mining claims have been staked throughout the area, and the annual assessment work required to maintain rights to these claims, along with other exploration, are causes of continual disturbance of the habitat.

A 1983 field survey located a new population of Jones cycladenia, which consists of about 3,000 individuals over approximately 2 miles in the Purple Hills area of Garfield County. This population occurs on parts of Glen Canyon National Recreation Area (GCNRA), Capitol Reef National Park, and Bureau of Land Management (BLM) lands. The GCNRA and BLM lands currently are managed for multiple use. Leases issued and pending adjacent to the Purple Hills population indicate interest in tar sands development. There are also oil and gas leases and mining claims in the Purple Hills region.

A third very small population (only 12 to 20 plants) of Jones cycladenia occurs

on BLM land in Professor Valley (Onion Creek), northeast of Moab. Heavy use of motorcycles in this area has worn denuded strips through the small population. There is also a single large plant in adjacent Castle Valley that was discovered in 1968. No other plants have been found in Castle Valley despite many searches. Possibly another population could still occur in southern Utah or northern Arizona, but it is known only from an indefinite 1882 collection and has not been seen since that time.

Potential Conservation Actions

If the proposal to list Jones cycladenia as Endangered becomes final, this plant could benefit from the conservation measures authorized by the Endangered Species Act. Under Section 7 of the Act, Federal agencies are required to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of Endangered plants. Although potential threats from vandalism and collecting have precluded proposing a formal designation of Critical Habitat for Jones cycladenia, the habitat conservation provisions of Section 7 would still apply.

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NMFS Proposes Additional Protection for Two Species of Seals

Proposed rules to provide additional protection for two seal species were recently published by the National Marine Fisheries Service (NMFS), Department of Commerce, which has Endangered Species Act jurisdiction over most marine animals.

sion and subsequent lists without explanation. It already receives protection from take under the Marine Mammal Protection Act, and it is listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Listing the Guadalupe fur seal pursuant to the Endangered

Species Act of 1973 would complement the existing protection through the Act's interagency consultation process (Section 7).

Since most of the current areas that meet the Act's definition of Critical Habitat are outside of U.S. territory, such a continued on next page

Guadalupe fur seal

On January 3, 1985, NMFS proposed listing the Guadalupe fur seal (*Arctocephalus townsendi*) under the Endangered Species Act of 1973 as a Threatened species. This small to medium sized (50–160 kilograms) seal once may have ranged from the Revillagigedo Islands (which are about 300 miles south of Baja California, Mexico) to Monterey Bay, California. NMFS estimates that the historical population included at least 30,000 seals. During the early to mid-19th century, commercial fur sealers of various nationalities hunted this animal to its presumed extinction.

The discovery years later of a few seals at Guadalupe Island, Mexico, rekindled hope for the species' eventual recovery. Recent surveys indicate that the total population now consists of about 1,600 animals at Guadalupe Island and is still growing. One reason they remain vulnerable is that the species currently is known to breed only along the eastern shore of Guadalupe Island. Prior to its overexploitation, the Guadalupe fur seal likely bred from the California Channel Islands south to at least Guadalupe Island, and perhaps even to the southern limit of its range.

A very small number of non-breeding seals are sporadically sighted off southern California. There is a possibility that the offshore oil development activities that are intensifying in southern California waters could affect individual seals in their pelagic habitat or on haul-out areas at San Miguel and San Nicolas Islands. Fur seals rely on their thick pelage for insulation from the cold water, and contact with oil can damage its insulating qualities. Another potential impact could result from the U.S. Air Force's Space Shuttle Program; launches from California will probably cause high intensity sonic booms over the northern Channel Islands. These noises could cause short-term disturbance to any seals present, although the potential effects on seals are unknown.

The Guadalupe fur seal was included on the original (1967) Federal list of animals considered "threatened with extinction," but was omitted from a 1970 revi-



Guadalupe fur seal



Hawaiian monk seal with pup in waters off Laysan Island. Such shallow inner-reef waters are critical to weaned pups learning to feed; mature seals also feed there, as well as in deeper waters around the islands.

Photo by David B. Marshall

Special Report: California Condor

Building a Captive Breeding Flock

by Robin B. Goodloe
Endangered Species Research Branch
Patuxent Wildlife Research Center

- second of two parts -

Building a Captive Propagation Flock

California condors have not yet been bred in captivity, although captive Andean condors and other vulture species have reproduced successfully. Only one adult California condor, a 16-year old male, currently is held in captivity. Since late 1982, however, 15 young condors, representing offspring from each of the five pairs now known to exist in the wild, have been added to captive flocks at the Los Angeles Zoo and the San Diego Wild Animal Park. Some of these young condors originally hatched in the wild, including a free-flying male that was trapped in 1982 as a yearling, three birds (one female and two males) taken into captivity as preflight nestlings in 1982 and 1983, and a male chick removed from the nest of the condor pair that was located in 1984. The majority of the captive birds, however, hatched from eggs that were taken from wild

nests and then incubated artificially at the San Diego Zoo.

In 1983, four eggs were taken from three wild condor pairs and successfully hatched, producing a male and three female chicks. An additional eight eggs were taken from four pairs in 1984, but two of the chicks that hatched failed to survive. One was severely deformed and lived only a half hour after hatching, while the second died from an apparent bacterial infection of the yolk sac several days after hatching. The six other 1984 eggs, however, hatched as healthy female chicks.

Increases in Production

In 1983, first clutch eggs were taken for artificial incubation from the three known active nests in the wild. Two pairs recycled and laid replacement eggs. One pair lost its second egg, probably to ravens (*Corvus corax*), and

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designation has not been proposed for the Guadalupe fur seal. If the breeding habitat is degraded, the seals expand their breeding range into the Channel Islands, or important foraging habitat is identified in U.S. waters, a Critical Habitat proposal may be considered. In the meantime, if the seal is listed under the Endangered Species Act, it will receive Section 7 protection anyway by virtue of its listed status. Federal agencies will be required to ensure that any actions they fund, authorize, or carry out in areas under U.S. jurisdiction are not likely to jeopardize the species' survival. In addition, all of the Act's take and trafficking controls will apply.

Critical Habitat for Hawaiian monk seal

NMFS also has proposed (F.R. 1/9/85) to designate Critical Habitat for the Endangered Hawaiian monk seal (*Monachus schauinslandi*). A Critical Habitat designation should help in this case to prevent adverse modifications to the delicate and important coastal ecosystem of the Northwestern Hawaiian Islands. If made final, the designation will implement an important recommendation of the Hawaiian Monk Seal Recovery Plan (see feature in BULLETIN Vol. IX No. 4).

After a lengthy review, NMFS decided to propose Critical Habitat for all beaches, lagoon waters, and ocean waters out to a depth of 10 fathoms around Kure Atoll, the Midway Islands (except for Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, French Frigate Shoals, Gardner Pinnacles, Necker Island, and Nihoa Island. This designation would incorporate essential breeding, pupping, and hauling-out areas; nearshore waters used by females and pups during nursing and post-weaning periods; and a portion of the foraging habitat used during the breeding season.

Although there are no inherent restrictions on human uses of an area that is designated as Critical Habitat, this designation generally overlays the Hawaiian Islands National Wildlife Refuge (see map on page 9), where entry is prohibited without a permit. Rather, the Critical Habitat designation reinforces the protection listed species already have under the Endangered Species Act, and notifies Federal agencies that any of their activities that may affect such an area are subject to the interagency consultation requirements of Section 7 of the Act.

Comments on the Critical Habitat proposal should be sent to E. C. Fullerton, Regional Director, Southwest Region, National Marine Fisheries Service, 300 S. Ferry Street, Terminal Island, California 90731 by March 11, 1985.



Research biologist from the Condor Research Center transfers a breeding pair's third egg of the season.

Photo by Rob R. Ramey II

California Condor

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subsequently laid a third egg, the first documented case of *triple*-clutching in California condors. The chick that hatched from this third egg, along with a chick produced by a second condor pair that was discovered in May 1983, were taken into captivity.

The second egg of the third condor pair known to be nesting in 1983 was taken into captivity following an outbreak of incubation disputes between the adult birds similar to those that caused the pair to lose its two eggs the previous year (See BULLETIN Vol. VII No. 5). This pair did not lay a third egg; however, a dummy egg and, later, a wax-filled swan's egg equipped with transmitters and two temperature sensors were fostered into the nest to allow continued study of the pair's behavior and to provide information on incubation temperatures and egg turning frequency. In early June, the telemetered egg was replaced with a 10-day old captive-reared female Andean condor to determine if incubating California condors would accept a fostered chick. The chick, however, was accidentally nudged out of the nest by the adult female and was returned to captivity.

In 1984, similar egg removal procedures were followed. Three of four condor pairs nesting this year recycled following removal of their first eggs. All replacement eggs, including a third egg that was laid in a nest harassed by ravens, were taken into captivity. Both pairs from which pre-flight chicks were taken in 1983 successfully laid eggs again on schedule in 1984.

This selective removal of eggs and pre-flight nestlings has had a significant impact on condor egg production, hatchability, and survival of young. From 1980 to 1982, the 3 condor pairs that were known to breed produced a total of 10 eggs (an average of 3.3 eggs per year). Five of these eggs were destroyed during intrapair fights, by ravens, or by other factors, but the other five hatched successfully (50 percent or an average of 1.67 eggs per year). One nestling died before fledging, a second was taken into captivity after the parents began to feed the chick sporadically, and 3 chicks fledged, in successive years, into the wild (for an average of 1.33 fledglings per year).

In contrast, the same 3 pairs produced 13 eggs from 1983 to 1984, when egg and chick removal was employed. Twelve hatched (92.3 percent or an average of 6 per year), and 11 chicks fledged (91.7 percent or an average of 5.5 per year). This represents a *four-fold* increase in fledgling production by the three pairs, an increase that is di-

rectly related to FWS/NAS activities to encourage multipleclutching and annual breeding.

Plans for the Future

The research and recovery program for the California condor is scheduled to continue well into the next century, with emphasis on identification and protection of condor habitat, increased production of eggs and chicks by wild pairs, further identification of mortality factors, and propagation and release of captive birds. Specific goals for the period from 1984 to 1987 include radio tagging 15 free-flying condors and 3 preflight nestlings; removal of first and second-clutch eggs to stimulate multiple clutching; maintenance of a captive flock with up to 5 individuals from each active breeding pair (subject to approval

by the State); and release of captive-reared birds equipped with radio transmitters. The first release of up to three birds is tentatively scheduled for spring 1985, depending on the success of the upcoming 1985 breeding season.

Research efforts during the past four years have been extremely productive. With continued success, it is hoped that California condors will again someday inhabit their former range in significant numbers.

* * *

The 1984 tally for the California condor:

- 15 free-flying birds known in the wild, including 5 known pairs.
- 16 birds in captivity, including one adult male (Topatopa) and 15 immature birds and young-of-the-year (10 females, 5 males).



Piru, the first California condor to hatch at the San Diego Zoo in 1984, gets an assist from birdkeeper Cyndi Kuehler.

Photo courtesy Zoological Society of San Diego

Creating Wood Stork Habitat: An Important Management Strategy

By

Warren Parker

Endangered Species Field Supervisor
Asheville, North Carolina

The wood stork (*Mycteria americana*), a large white bird that was listed as Endangered on February 28, 1984 (see BULLETIN Vol. IX No. 3), has been experiencing a major population decline for more than 50 years. From an estimated southeastern U.S. nesting population of 75,000 to 100,000 pairs in the early 1900s, levels fell to 10,000 pairs in 1960, 6,000 pairs in 1975, and 4,800 pairs in 1980. If this rate of decline continues, the species could become extinct by the turn of the century.

Widespread habitat damage, particularly that caused by artificial manipulations of natural water regimes in south Florida, and the effects of periodic droughts contributed heavily to recent declines. Since wood storks feed in shallow water (typically 6 to 20 inches deep), changes in water levels result in a lack of food resources and major declines in reproduction. It is surmised that these adverse conditions have forced some colonies to move northward seeking more favorable hydrological conditions.

The Birdsville wood stork colony was discovered in 1980. It is located near the Service's Millen National Fish Hatchery in Jenkins County, Georgia. About 100 breeding pairs comprise the rookery, and these birds forage out from the nesting site toward the U.S. Department of Energy's (DOE) 200,000-acre Savan-

nah River Plant, about 30 miles away. The planned restart of a "mothballed" atomic reactor at the plant has created an environmental controversy.

It was found that the Birdsville wood storks were foraging for fish in ponds within the Savannah River Plant, particularly in the lower reach of Steel Creek on a delta that was created by an earlier reactor operation where the creek enters the Savannah River. The reactor in question is one of three on the Savannah River Plant that produces "defense nuclear materials" (primarily plutonium and tritium) for use in nuclear weapons. If this reactivated reactor (the "L Reactor") is restarted, Steel Creek delta will be inundated by cooling water discharge, which will prevent use of the creek by feeding wood storks.

The seeming impasse brought together personnel from the DOE (which runs the reactors), the Du Pont Corporation (primary contractor), and the Fish and Wildlife Service. Out of the resulting discussions emerged the concept of attempting to create "new" foraging habitat. If a suitable site near the plant could be located, developed, and managed as foraging habitat, then the problem could potentially be mitigated. Fortunately, an abandoned 32-acre waterfowl management pond on adjacent property was located and found to be owned by the National Audubon Society (NAS). The pond

is currently in poor condition with a broken earthen embankment, but the NAS has expressed a willingness to work with the principals in this issue.

Continued negotiations are leading to a soon-to-be-completed agreement between the DOE and the NAS for the use of refurbishment of the 32-acre pond. DOE also has given the Service formal commitments for funding construction of subimpoundments within the pond, stocking of forage fish, and annual management and maintenance of the ponds—all oriented to the foraging needs of wood storks from the Birdsville colony. The facility will be in place and operating in mid-March 1985. Technical assistance on fish production is being provided by Auburn University. Dr. John C. Ogden, a nationally recognized authority on wood storks, will provide overall management strategy.

As a result of these comments by the DOE, the Service was able to provide DOE a biological opinion that the restart of the L-Reactor is not likely to jeopardize the wood stork's survival. If the habitat plan is proven successful, an important management tool will become available.

Given the right circumstances and incentives, development of managed wood stork foraging ponds might prove important to the survival of this rapidly declining species.



Photo by Don Pitzer

Widespread habitat damage and the effects of periodic droughts have contributed to the decline of the wood stork.

Plan Approved for Three Songbirds of the Northwestern Hawaiian Islands

The Northwestern Hawaiian Islands are well known for the rich assemblages of seabirds that use them for nesting. Less well known are the seven primarily terrestrial birds endemic to the islands. Three of them, unfortunately, became extinct early in this century. One of the four that survive, the Laysan duck (*Anas laysanensis*), was the subject of a December 17, 1982, recovery plan (see BULLETIN Vol. VIII No. 2). The other three are songbirds (order Passeriformes), and are included in the *Northwestern Hawaiian Islands Passerines Recovery Plan*, approved October 4, 1984:

...

Laysan finch (*Telespyza* [= *Psittirostra*] *cantans*)—Adult males of this species are characterized by a conspicuous, bright yellow head, throat, and breast, with dark green to black streaking on the upper back, blending to gray on the lower back. Females are brownish, streaked all over with more black above and a faint wash of greenish-yellow, particularly on the breast. Laysan finches also have a distinctive, heavy conical bill colored bluish to grey. Adults reach overall lengths of up to about 6.5 inches. They have a song described by Andrew J. Berger as "loud, melodious, and canarylike, even to the inclusion of trills." Being very bold birds, they are easily captured and were considered good "cage birds" by early explorers of the islands.

Their natural range is restricted to Laysan Island, a 1,005-acre coral sand atoll near the middle of the northwestern archipelago. Laysan finches are found in all of the island's native plant associations, although they apparently prefer the bunchgrass (*Eragrostis variabilis*) association. Thick bunches of this grass grow up to about 3 feet in height, providing cover, nesting sites, and some food. The finches feed on a wide variety of plant and animal material, including seeds, tender plant shoots and flower buds, and eggs of the more common seabirds that share the island.

Laysan's fragile ecosystem was severely damaged early in this century after introduced rabbits multiplied and consumed virtually all of the island's vegetation, turning it into a wasteland. Three of the island's endemic terrestrial birds, the Laysan millerbird (*Acrocephalus familiaris familiaris*), Laysan honeycreeper (*Himatione sanguinea freethi*), and Laysan rail (*Porzana*

palmeri), became extinct as a direct result. The Laysan finch, which was historically abundant on the island, declined sharply, but an estimated 100 still survived when the rabbits were eradicated in 1923.

As the island's vegetation recovered, Laysan finch numbers rose. Current estimates are that there is a relatively stable population of about 10,000 finches on Laysan. A 1967 introduction of the Laysan finch to Southeast Island in the Pearl and Hermes Reef group has resulted in an apparently self-sustaining second population of about 500 to 700 birds. Most of them are on Southwest Island, but some have dispersed over several small nearby islands. (An earlier population established at Midway's East Island was wiped out by accidentally in-

troduced rats.) This species has been listed as Endangered since 1967.

...

Nihoa Island is a 156-acre remnant of a volcanic cone with rough topography, many rocky outcroppings, several small valleys, and high cliffs along most of the island's edges. Two birds endemic to Nihoa also are subjects of the recovery plan:

Nihoa finch (*Telespyza* [= *Psittirostra*] *ultima*)—This bird resembles the closely related Laysan finch, particularly in its plumage, bold nature, and omnivorous diet, but is slightly smaller (about 5.5 inches in length). It is fairly widespread over Nihoa Island. Small holes in cliffs or rock outcroppings apparently are the preferred nesting sites.

continued on next page



Laysan finch

Photo by Robert J. Shallenberger

Research on census techniques in 1980 by Dr. Sheila Conant, M. S. Collins, and Dr. C. J. Ralph yielded a population estimate of about 1,608 Nihoa finches (using the fixed distance strip technique, the method used most often in the past). This species occurs nowhere else; attempts in 1967 by the Fish and Wildlife Service to establish a population on Tern Island (French Frigate Shoals) met with failure. The species was listed that same year as Endangered, due primarily to the vulnerability of the small population and its fragile habitat.

Nihoa millerbird (*Acrocephalus familiaris kingi*)—This bird, also endemic to Nihoa Island, can be distinguished by its plumage, dark gray-brown above and buffy-white below. The millerbird is relatively secretive, rarely leaving the dense, low cover vegetation (*Sida* and *Chenopodium*) where it nests. Its diet consists of insects, terrestrial ar-

thropods gleaned primarily from the shrubs.

The same team that censused the Nihoa finch came up with an estimate of about 338 millerbirds. Dr. Conant located approximately 100 acres of shrubby habitat in Nihoa's valleys, and the island's carrying capacity for the millerbirds appears to be a maximum of 600 birds. The amount of suitable habitat, however, may fluctuate over a period of time. Because of the island's low annual rainfall, one continuing threat is fire. The Nihoa millerbird was listed as Endangered in 1967, and no attempts have been made to establish populations on other islands.

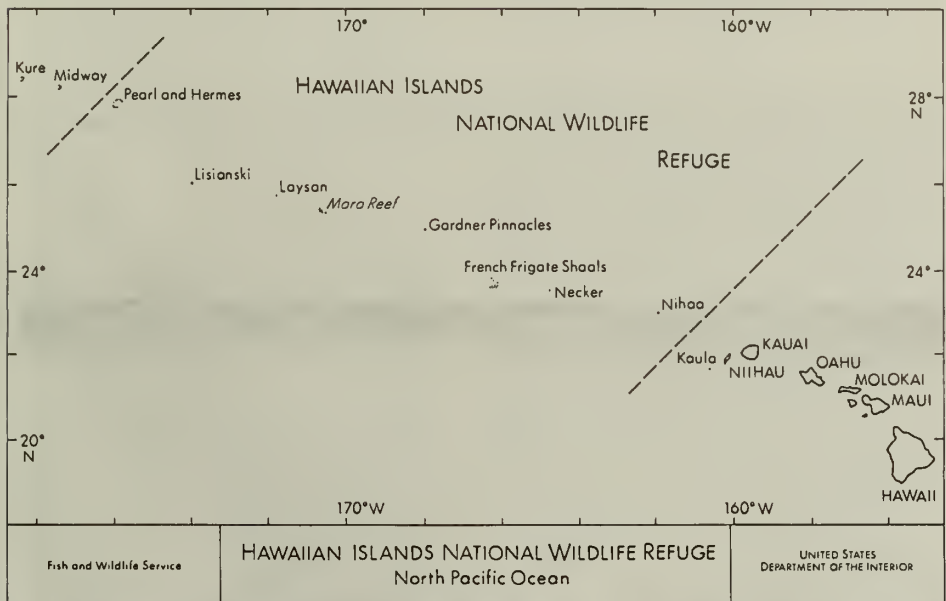
Due to the extremely limited distribution and sensitive habitat of the three birds, the negative impacts of any disruptions are likely to have serious impacts. The status of Laysan and Nihoa Islands as part of a Federal wildlife ref-

uge and as designated Research Natural Areas does provide legal protection, but trespass regulations are difficult to enforce in this remote region.

Any future intentional introductions of exotic animals or plants under current management guidelines are extremely unlikely, given the tragic example of the rabbits at Laysan earlier in this century. There is considerable concern, though, about *accidental* introductions. Rats, for example, have already caused severe problems for the avifauna of the main Hawaiian Islands by preying on chicks and eggs, and have demonstrated a remarkable ability to spread to the world's most remote unoccupied areas. If any were to escape onto Laysan or Nihoa from a shipwreck or from vessels illegally landing on the islands, they could become established and spell disaster for the passerines, seabirds, and native vegetation.

Exotic birds, such as common mynas (*Acridotheres tristis*) or Japanese bush-warblers (*Cettia diphone*), are also established on the main Hawaiian Islands. Although they are unlikely to reach the northwestern chain, the potential cannot be ignored. Mynas are known predators of nestlings and would compete with the finches and millerbird for food. Either exotic bird also could bring avian diseases to Laysan and Nihoa, with devastating results for the endemic avifauna.

The accidental establishment of certain other exotic animals and plants, more difficult to prevent, might have no less an impact. Predatory insects, such as carnivorous ants, could disrupt the food supply of the endemic passerines (particularly the insectivorous Nihoa millerbird) and even prey directly on hatchlings. Another possibility is that exotic plants may out-compete the native species that provide food and nesting sites.



Nihoa finch

Past Conservation Measures

In 1909, President Theodore Roosevelt issued an Executive Order establishing the Hawaiian Islands Reservation, protection that applied to the entire northwestern chain except for the Midway Islands. (Later, control of Kure Atoll was turned over to the Territory of Hawaii.) In 1940, the reservation was designated as the Hawaiian Islands National Wildlife Refuge. Under management by the U.S. Fish and Wildlife Service, landing on the refuge islands and entry into refuge waters are authorized only by Service permit. No activities are permitted within the refuge unless they are compatible with the purposes for which the refuge was established.

The three passerine birds covered in this recovery plan also receive the full protection of the Endangered Species Act. Studies on these species have continued on page 10

Plan Approved for Three Songbirds

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been conducted by Service biologists and independent researchers (operating under Service permits) for many years. More recent efforts have been directed toward developing an inventory of the resources of these islands. Meanwhile, it is likely that periodic monitoring of the Endangered bird populations and their habitats will continue.

Recovery Actions

The recovery program for the three songbirds of the Northwestern Hawaiian Islands is somewhat different from those covering most other species. Although these birds are indeed in danger of extinction, it is not because their current populations are significantly lower than historical levels. They have always occurred in relatively low numbers and have always been restricted to extremely limited natural habitats. It is their inherent vulnerability that makes the birds Endangered. Therefore, the foundation for the recovery program will be protection of the delicate ecosystems that support the birds.

In the *Northwestern Hawaiian Islands Passerines Recovery Plan*, three main conservation strategies are emphasized. First, all feasible steps should be taken to prevent any introductions of exotic animals or plants; second, a monitoring program should be set up to detect changes in the distribution and abundance of exotics; and third, specific plans for dealing with invasions of exotics, changes in habitat, and declines in bird populations should be developed. Once these tasks are accomplished, consideration can be given to reclassifying the three birds from Endangered to Threatened. However, because it is not possible to completely remove all potential threats to the birds and their habitat, it is likely that they will always remain in need of special protection.

Maintaining the Fish and Wildlife Service's strict controls on human entry into, or use of, the Hawaiian Islands National Wildlife Refuge is critical to the success of the recovery effort. The plan calls for taking every opportunity to impress upon those most likely to come into contact with the refuge islands—operators of fishing boats, freighters, sailboats, etc.—the fragility of the resource and the existence of protective regulations. Agencies such as the U.S. Coast Guard, the National Marine Fisheries Service (NMFS), and the Hawaii State Division of Aquatic Resources will be encouraged to note the restricted areas on the maps, charts, and notices they provide. The remoteness of the islands creates logistical dif-

ficulties in enforcing the regulations; therefore all opportunities for periodic patrols should be used. For example, the Coast Guard and NMFS will be requested to assist, when possible, during their operations in the area. (NMFS conducts surveillance of foreign fishing activities in the area and carries out research on the Endangered Hawaiian monk seal, and the Coast Guard flies supplies to its navigation station on Kure Atoll.)

Although the regulations governing access to the refuge should minimize the chances that thoughtless persons might introduce exotic animals or plants, whether by accident or intent, there will always be a degree of risk. A "safety check," perhaps consisting of a list of steps such as vessel inspection, should be developed for use by all authorized management and research personnel landing on the islands. (An important part of the recovery plan is a recommendation for researchers to census the bird populations at least annually.) Not only are there the obvious dangers of introducing rats to the islands; the entry of smaller organisms, such as mosquitos, other insects, or plant seeds, may be as harmful and at least equally difficult to prevent.

In case, despite all precautions, harmful exotic organisms do become established, the Service needs to develop techniques for detecting and dealing with a potential disaster. Since prompt action will be necessary, a contingency plan should be established prior to an outbreak. There are, for example, a variety of techniques for control of rodents and other exotics, and all should be explored. Experimentation could take place at Midway, where some of the harmful species have already become established.

Some exotic plants, and perhaps even some small invertebrates, are already established on Laysan and Nihoa Islands. At present, they do not appear to pose problems for the millerbird or

finches, but there may be more subtle long-term impacts. Decisions will eventually have to be made on whether or not it is necessary to initiate eradication or control efforts.

Plans also should be developed to deal with the possibility that widely-ranging seabirds, or perhaps a vagrant exotic, occasionally carry avian diseases to the northwestern islands. In the event that disease is detected in the native passerines, it would become necessary to isolate at least some of any remaining healthy birds in a safe environment until the problem is resolved.

As is the case with efforts for all species, the key to maintaining stable populations of the three passerines is to conserve the ecosystems upon which they depend. Unfortunately, because of their limited numbers and range, there will probably always be a possibility that these birds could quickly become extinct. One safeguard against extinction might be to establish and maintain captive breeding flocks. There are several obvious drawbacks to such an approach, including the expense and possible genetic drift in captive populations. If it is attempted, however, priority will probably be given to the Nihoa finch since there are already two populations of the Laysan finch and since the Nihoa millerbird is considered delicate and difficult to handle in captivity.

An alternative, at least for the Nihoa millerbird, might be to establish a second population of this bird on Laysan Island, where it presumably could fill the niche left open by the now extinct Laysan millerbird. Because the two subspecies were always considered very similar, a taxonomic review could be undertaken to determine if they were in fact the same bird. If it is found that they were two distinct subspecies, a decision would have to be made on whether or not to introduce the Nihoa millerbird onto Laysan Island anyway. Current policy does not allow the Service to translocate a taxon outside its historical range without the Director's approval, which would be given only for particularly compelling justification.



Nihoa millerbird

Photo by Robert J. Shallenberger

Regional Briefs

continued from page 2

Region 3—On January 15, representatives from the FWS, the U.S. Army Corps of Engineers, and several States met in St. Louis, Missouri, to discuss future survey techniques for the interior least tern (*Sterna antillarum athalassos*). This species, proposed for listing on May 29, 1984 (see BULLETIN Vol. IX No. 6), nests on sandbars in the Missouri and Mississippi Rivers and their tributaries. The least tern population has declined because of vegetative encroachment, stream channelization, and reservoir construction.

* * *

Bald Eagle Appreciation Days were held in Keokuk, Iowa, on January 19 d20 with the States of Illinois, Iowa, and Missouri as joint hosts. This annual event provides the opportunity for several hundred people to view our Nation's symbol in its winter habitat. Despite sub-zero temperatures, attendance was high, making this year's event a big success.

* * *

Region 4—A December 1984 tour of the known populations of the Florida golden aster (*Chrysopsis floridana*), a Category 1 listing candidate, confirmed that this husky perennial requires a habitat of bare, dry sand. Its historical distribution included what is now St. Petersburg Beach, but its largest current populations are on vacant lots in a subdivision where partial bulldozing of sand pine scrub created sizable patches of sand that the golden aster readily colonized. Mature plants were found producing abundant flowers and seeds. This species, like some other Florida plants, has substantially lost the natural ecosystems upon which it depended.

In other Region 4 plant news, an effort by the Florida Native Plant Society to propagate the Category 1 candidate four-petal pawpaw (*Asimina tetramera*) has been successful. One hundred 2-year-old potted seedlings of the pawpaw are reaching flowering size (about 18 inches tall), and six have already been transplanted to suitable habitat in a county park. The plant's range is along the Atlantic coast from Palm Beach to Hobe Sound, an area that has become urbanized in the past decade. Like the Florida golden aster, this species inhabits sand pine scrub and only about 300 plants remain in the wild. Cultivated seedlings may be useful both as a source of ornamental shrubs and for restocking where the pawpaws have died out.

* * *

The silver rice rat (*Oryzomys argentatus*), a species that occurs on some of the lower Florida Keys, was discovered in 1973 and described just recently in 1978, yet concerns already have arisen about its survival. In 1980, the Service was petitioned by a conservation group to list it as Endangered because, at that time, it was known only from a handful of specimens, and it was feared that the rapid residential and commercial development of the lower Keys would eliminate the species entirely within a short period of time. This small mammal depends on relatively remote, undeveloped wetlands with dense vegetation. However, so little was known about the biology, distribution, status, and precise threats to this newly discovered animal that the Service decided to fund a field survey before acting on the petition. The survey has now been completed, and the results have been submitted to the FWS Jacksonville Field Station for review and analysis.

* * *

A formal Section 7 consultation with personnel representing the U.S. Marine Corps at Camp Lejeune, North Carolina, revealed the need for close coordination and field inspection while a 27-mile reach of railroad owned by the Marine Corps between Camp Lejeune and Cherry Point is being upgraded. The antiquated rail system must be refurbished to allow heavy armor and other equipment of the 2nd Marine Division to be rapidly transported to the port facility at Morehead City, North Carolina.

The track crosses a zone of approximately 7 miles within the Croatan National Forest, which is inhabited by a high population of Endangered American alligators (*Alligator mississippiensis*). These animals, some up to 10 feet in length, are commonly seen sunning along the tracks. The construction activities include the redigging of old borrow ditches and the clearing of timber within the right-of-way. During the consultations, FWS stressed the need to avoid adversely impacting the alligators during their nesting season and at periods during the winter months when they become dormant.

A solution was reached that will defer construction activities during these two critical periods. The Marines agreed to allow contractors to work in the sensitive 7-mile reach of railroad only during the periods of October 1–December 15 and March 15–June 15. As a result of these commitments, the FWS was able to issue a "not likely to jeopardize" biological opinion to the base commander.

* * *

Region 5—The State of Delaware has entered into an Endangered Species

Program cooperative agreement with the FWS (effective January 31, 1985) for the conservation of plants. Grant funds authorized under Section 6 of the Endangered Species Act have been set aside this fiscal year to assist Delaware in its research and conservation efforts for several candidate plant species.

* * *

During the annual bald eagle winter survey in Massachusetts, five marked birds were observed at Quabbin Reservoir, the bald eagle hacking site in that State since 1982. The eagles were identified as one bird released in New York in 1983; one that hatched in Michigan and then was released in Massachusetts in 1982; another from Manitoba that was released in Massachusetts in 1983; and two from Nova Scotia that were released in Massachusetts in 1984.

* * *

On January 9, a meeting of the Chesapeake Bay Bald Eagle Recovery Team and representatives of participating States was held at the Patuxent Wildlife Research Center. Discussions centered around revisions of recovery plans and 1984 progress toward planned goals for the species. In 1984, there were 124 occupied bald eagle breeding territories in the Chesapeake Bay region. From 123 nests known to produce young, 130 young fledged, which indicates an average productivity rate of 1.06 young per occupied nest. Of the young produced, 109 (84 percent) were banded by members of the Chesapeake Bay bald eagle banding team.

* * *

Region 6—The Peregrine Fund reports continued success in peregrine falcon (*Falco peregrinus*) recovery activities in the Rocky Mountains. For the first time in many years, peregrine falcons are nesting and producing young in Montana and Wyoming. In June 1984, biologists discovered Montana's only known active eyrie, which contained two healthy, week-old peregrines. The eyrie is located near the State's first hack site, established in 1981. The adults at this site were captive-produced and wore FWS and Peregrine Fund bands. Also in June, Wyoming biologists conducting a routine check of a historical eyrie in Yellowstone National Park observed that the eyrie was occupied and contained three young birds. This was the first time in over 10 years that the site had been occupied by peregrines.

Peregrines in Utah again raised young at one hack tower and others defended a second tower. Although no peregrines

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Regional Briefs

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have been released in Salt Lake City, three peregrines have appeared there and a pair stayed all summer, courting and making nest scrapes on ledges of the Hotel Utah and other large buildings. No eggs were produced by this pair, however, since the female was only a year old.

* * *

In the Regional Briefs section of BULLETIN Vol. IX No. 12, the contact person for information on grizzly bears was given as Dave Flemming of the FWS Region 6 staff. Please note that the correct contact person is Mr. Chris Servheen, U.S. Fish and Wildlife Service, HS 105D, University of Montana, Missoula, Montana 59812; telephone FTS 585-3223 or commercial 406/329-3223.

* * *

Recovery Plan Update

During January 1985, three recovery plans were approved: the *Small Whorled Pogonia Recovery Plan* (1/16/85); the *Pink Mucket Pearly Mussel Recovery Plan* (1/24/85); and the *Tubercled-, Turgid-, and Yellow-blossom Pearly Mussels Recovery Plan* (1/25/85).

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests should be made to the Fish and Wildlife Reference Service, 1776 E. Jefferson Street, Suite 470S, Rockville, Maryland 20852; telephone 800/582-3421.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	20	19	234	4	0	22	299	21
Birds	59	13	144	3	1	0	220	52
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	29	4	11	14	3	0	62	36
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	4	0	0	12	9
Plants	67	5	1	9	2	2	86	34
TOTAL	225	47	461	51	10	37	831	200**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 167

Number of species currently proposed for listing: 31 animals
37 plants

Number of Species with Critical Habitats determined: 68

Number of Cooperative Agreements signed with States: 41 fish & wildlife
16 plants

January 31, 1985

Utah Plant

continued from page 3

Possible effects of a listing on BLM and NPS activities are expected to be limited. Both agencies funded some of the field surveys on Jones cycladenia, and they are aware of the population sites for planning purposes. Special care in administering mining claims and oil/gas leases will be needed. Restricting access to certain roads also could be found necessary.

The Act makes it illegal to engage in interstate or international trafficking in Endangered plants or to "remove and reduce to possession" Endangered plants from lands under Federal jurisdiction. Permits for those prohibited activities are available only for approved scientific or conservation purposes. Other benefits of listing include the requirement for the Service to develop a recovery plan and the possibility of Federal funding to Utah if it obtains a cooperative agreement for the conservation of listed plant species through Section 6 of the Act.

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Technical Bulletin

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Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

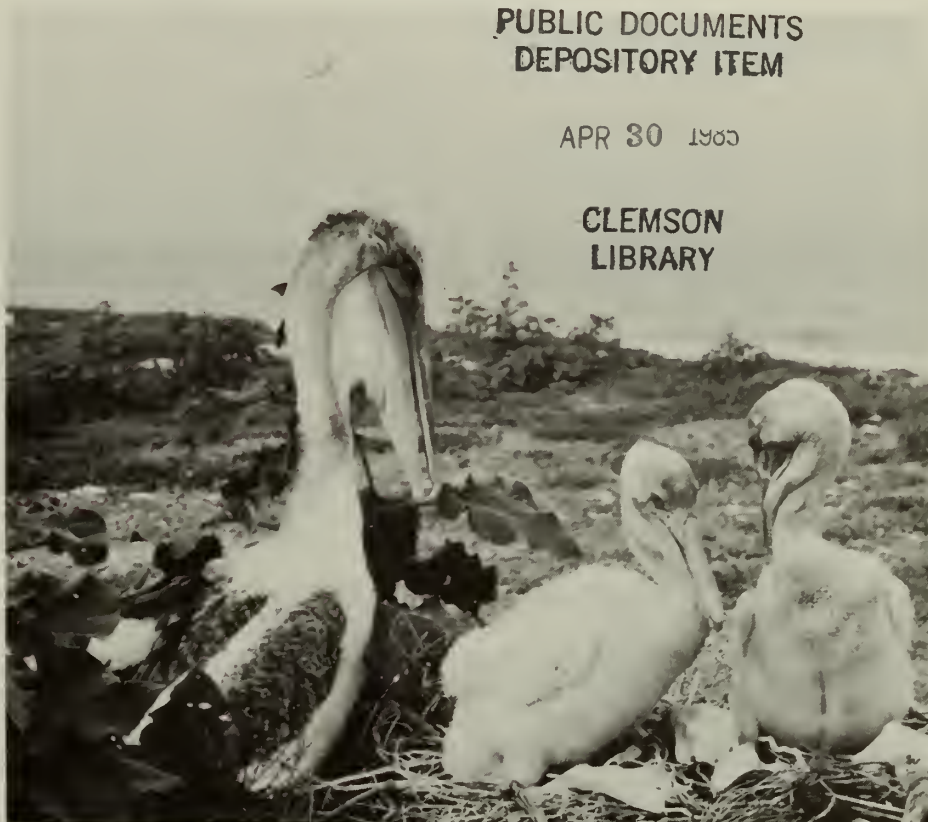
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Brown Pelicans in Southeastern U.S. Delisted After Recovering From Effects of DDT

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Adult brown pelican and immature young at nesting site

Photo by Steve Van Riper

The eastern brown pelican (*Pelecanus occidentalis carolinensis*) has recovered well enough in most of the southeastern United States from the devastating effects of DDT that the Service has removed a population of this large bird from the U.S. List of Endangered and Threatened Wildlife and Plants (F.R. 2/4/85). Brown pelicans and their habitat in Alabama, Florida, Georgia, North and South Carolina, and points northward along the Atlantic Coast are no longer given the special protection authorized by the Endangered Species Act of 1973. Within the remainder of its range, which includes coastal areas of Mississippi, Louisiana, Texas, California, the West Indies, both coasts of Mexico, Central America, and South America, where its populations are not secure, the brown pelican remains listed as Endangered and protected by the Act.

Historically, large numbers of brown pelicans nested on small coastal islands along the shores of Texas, Louisiana, Florida, and South Carolina. A smaller number nested in North Carolina, and perhaps a few in Georgia. Between 1957 and 1961, however, the pelican disappeared from the Louisiana coast as a nesting bird, and it was nearly extirpated in Texas. The suddenness and severity of this population crash suggested that a toxic substance was to blame.

It became clear that the problem was more widespread in the late 1960s and early 1970s, when brown pelican populations in South Carolina showed evidence of decreased reproduction, primarily from eggshell thinning. The decrease was similar to, although less severe than, what happened in California, where thin-shelled eggs and other complications resulted in complete reproductive failure of brown pelicans in the late 1960s and early 1970s.

Organochlorine pesticide pollution was implicated as the main cause of these population declines—endrin in Louisiana and Texas, and DDT (and its principal metabolite DDE) in California and South Carolina. These chemicals, which do not easily or quickly break down into less harmful substances, accumulated in the food chain and affected pelicans in two ways. Endrin was directly toxic to all age

classes. DDE interfered with calcium deposition during eggshell production, resulting in thin-shelled eggs that too easily broke during incubation. (This problem was not unique to pelicans; DDE contamination also jeopardized other avian predators, including the bald eagle and peregrine falcon.)

As a result of the observed declines, the threat of further declines from food supplies that were becoming increasingly contaminated, and the uncertain status of the species in other areas where contamination was anticipated, the brown pelican was listed in 1970 throughout its entire range as Endangered.

Two years later, the Environmental Protection Agency banned the use of DDT in the U.S., and the use of endrin has been curtailed. Environmental residues of these persistent compounds have been decreasing in most areas, and there has been a corresponding increase in the

eggshell thickness and reproductive success of brown pelicans and other birds. Annual population surveys now are indicating more or less stable or even increasing numbers in many areas. In fact, within the areas affected by the delisting rule, pelican populations are at or above historical levels. Further evidence of the pelican's expanding population was seen in 1983-1984, when four pairs attempted to nest on an artificial spoil island in Mobile Bay, Alabama, the first such record for that State. Accordingly, delisting was recommended by the Eastern Brown Pelican Recovery Team.

In response to the Service's November 10, 1983, proposal to remove the southeastern U.S. population of the brown pelican from Endangered Species Act protection, a total of 47 comments were received from a variety of interests, including State wildlife agencies, local gov-

(continued on page 4)



REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of February:

Region 1—The Sacramento Endangered Species Office (SESO) staff assisted the California Department of Fish

and Game (CDFG) in conducting a winter census of the California clapper rail (*Rallus longirostris obsoletus*) in marshlands around San Francisco Bay. An airboat was used to flush rails during the highest winter tides, when almost all cover is inundated and rails are most visible. The

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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technique typically enables a virtually total count of rails in each marsh. With the exception of Napa Marsh, which has not been censused in more than 3 years, the CDFG censused all major marshes around the bay at least once over the past three winters. Results of these surveys indicate that the current California clapper rail population numbers only about 30 percent of previous population estimates—about 1,400–2,000 rails as compared to the 4,200–6,000 rails estimated in the mid-1970s.

Through a cooperative effort, Chevron and the SESO planted approximately 500 buckwheat seedlings during January on a remnant sand dune habitat located at Chevron's El Segundo refinery in California. The buckwheats are foodplants for the Endangered El Segundo blue butterfly (*Euphilotes battoides allyni*), which occurs on the small habitat at El Segundo and the dune system near the west end of Los Angeles International Airport. Buckwheat seeds were collected last year from mature plants at the refinery site.

Efforts to recover the Threatened Paiute cutthroat trout (*Salmo clarki seleniris*) were set back recently when it was discovered that the population in Coyote Valley Creek (Alpine County, California) is of hybrid origin. On a more positive note, however, it was confirmed recently through electrophoretic analysis that the population in Cabin Creek (Mono County, California) is of pure stock, although that stream was found from a population that contained some hybrid fish. In view of this finding, it will not now be necessary to chemically treat Cabin Creek to remove the existing population.

Region 2—Secretary of the Interior Donald Hodel has announced the Service's acquisition of the Buenos Aires Ranch near Tucson, Arizona, as a national wildlife refuge for the Endangered masked bobwhite (*Colinus virginianus ridgwayi*). This black-headed quail formerly ranged from north-central Mexico into southern Arizona. Due to widespread destruction of its habitat in the late 1800s, this bird is no longer known to occur in the wild in the United States, although small numbers survive in Mexico. The FWS plans to release captive-raised masked bobwhites this summer as part of the continuing effort to reestablish a self-sustaining wild population of the quail within the new refuge. Masked bobwhites have been successfully bred at the FWS Patuxent Wildlife Research Center in Laurel, Maryland, for several years, but the success of past releases has depended upon the amount of cover left after livestock grazing. Purchase of the ranch as a national wildlife refuge will allow the FWS to control grazing and recover the quail.

(continued on page 3)

Whooping cranes (*Grus americana*) of the New Mexico wintering flock and their sandhill crane (*Grus canadensis*) foster parents began moving northward into the San Luis Valley of Colorado as early as February 15. By February 25, about 17,000 sandhills had moved into Colorado. Approximately 2,500 sandhill cranes and five whoopers remained in New Mexico at that time, but they were expected to leave the Rio Grande Valley in a few days. The five whoopers remained at Bosque del Apache National Wildlife Refuge (NWR) despite the snow goose hunting under way there since February 13.

The snow goose hunt on Bosque NWR this winter was set for February 13–28 to minimize disturbance to the whooping cranes. During the 1983–84 hunting season, the snow goose hunt on Bosque NWR consisted of four 4-day hunts held in mid-November, early and late December, and mid-January. Each hunt period was followed by 10 nonhunting days. During each hunt, whoopers that had been staying on the refuge dispersed to other areas in the Rio Grande Valley and consequently were subject to greater danger from waterfowl hunters and other hazards in areas where hunting is not as closely managed.

After each hunt period on Bosque, some whoopers returned to the refuge, but the numbers were less than those present before the hunt. The peak whooper population using the refuge in 1983–84 was 13 in late November, but only 7 were present in late January after the last snow goose hunt. As a consequence of the whoopers' reaction to hunting activity, the 1984–85 hunt was scheduled entirely for mid- to late February, a time when the cranes would be preparing to migrate into Colorado. In the absence of the mid-winter hunting, opportunities for whoopers to develop pair bonds become enhanced because the birds spent most of the winter on the refuge in regular contact with other whoopers. The whooper population on Bosque NWR did respond favorably to the change in hunting patterns. The 1984–85 whooper population peaked at 16 in December and stayed at that level until early February.

It is worth noting that the wintering period is over and there was only one known whooping crane mortality in the Gray's Lake population. The cause of death is attributed to avian cholera (the first ever recorded). No other whoopers are known to be sick, which is a credit to the prompt management action of FWS refuge personnel. An avian cholera outbreak began in mid-November on Bosque NWR among snow geese and continued into February. Management measures to diminish disease losses included pumping clean water through roosting sites to dilute and wash away the cholera bacteria, knocking down corn in scattered fields to

disperse the feeding birds and to keep birds in good condition so they could resist the disease, and removal of all carcasses. About 600 snow geese, 50 sandhill cranes, and 40 miscellaneous waterfowl died in the cholera outbreak that undoubtedly would have been much worse had the FWS not promptly initiated control measures.

Arizona State University and Arizona Game and Fish Department personnel collected 2,400 razorback sucker (*Xyrauchen texanus*) larvae from Lake Mohave, Arizona. The larvae were transported to Dexter National Fish Hatchery in New Mexico to supplement the brood stock already at the hatchery. This action was taken in order to maintain the genetic diversity of this Category 2 candidate species.

Region 3—On February 19, the Eighth Circuit Court of Appeals ruled on the regulations regarding wolf management in Minnesota (see BULLETIN Vol. VIII No. 9). The court affirmed that sport trapping of wolves was illegal, reversed and remanded to the lower court the predation control regulations, and affirmed the attorney's fee award.

William Harrison has joined the Region 3 staff as the regional botanist. Bill will be responsible for coordinating all plant work in the region, including recovery plan and listing package development.

Specific population goals for Threatened and Endangered species are being established for each of the national wildlife refuges within Region 3. Similar to what the U.S. Forest Service has done on the national forests, this effort will assist the States in developing management plans for each individual species on a statewide basis.

Region 4—In late winter 1984, personnel from the FWS Asheville Endangered Species Field Station and representatives from the North Carolina Museum of Natural History discovered a small hibernating colony of Virginia big-eared bats (*Plecotus townsendii virginianus*) in western North Carolina. This Endangered species was not previously known from the State. The North Carolina Wildlife Resources Commission has received funding, through the Endangered Species Act's Section 6 grant program, for a 2-year study of the distribution of Virginia big-eared bats in North Carolina. This will be a cooperative effort among the FWS, the Museum of Natural History, and the Wildlife Resources Commission. (See story on big-eared bats on page 5.)

The FWS recently provided funds to the Virginia Polytechnic Institute's Cooperative Fishery Research Unit to study the ef-

fects of sewage treatment plant discharge on freshwater mussels. The outflows from these plants contain chlorine and ammonia, and form chloramines upon entering the receiving stream. A review of the existing literature indicates that these substances may be highly toxic to aquatic invertebrates. A field study will be conducted to determine changes in species composition, distribution, and abundance of mussels at predetermined distances below sewage treatment plants. Laboratory bioassays will test the tolerance of several mussel species to various concentrations of chlorine, ammonia, and chloramines. Results will be valuable in maintaining and recovering the diverse Endangered mussel fauna of the Tennessee River system.

One of the suspected threats to the flattened musk turtle (*Sternotherus depressus*), a Category 1 candidate species, is siltation caused by surface mining for coal. The Office of Surface Mining, which is responsible for the issuance of surface mining permits and their environmental impacts, has provided \$60,000 to help the FWS determine the impacts of surface mining on the flattened musk turtle. The FWS will conduct a study of the relationship between the distribution of these turtles and the occurrence of surface mines. Water quality analyses should provide an indication of water quality problems, and the alleviation of such problems should be accomplished by modification of surface mining procedures and/or effluent limitations. Any recommendations from this study are to become standard stipulations in all coal leasing, reclamation, and grant activities in the upper Black Warrior River Basin. These measures should contribute to the protection of the flattened musk turtle.

In early November 1984, FWS Jacksonville, Florida, Endangered Species Field Station personnel freed a female manatee (*Trichechus manatus*) that had become entangled in an oil boom line at the outflow of the Jacksonville Electric Authority's Southside Generating Plant. The female, accompanied by a large calf, was subsequently photographed to document its scar patterns, which are useful in identifying individual manatees.

In late January 1985, personnel of the FWS Sirenia Laboratory in Gainesville, Florida, censused manatees at the Florida Power and Light Company's Riviera Beach Power Plant following a severe cold front. Two hundred-thirty manatees were counted at the outflow of the power plant, among them the manatee and calf noted at Jacksonville in November. They had migrated over 300 miles from Jacksonville to Riviera Beach in about 2 months.

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Proposed Endangered Status for Caribbean Plant

Zanthoxylum thomasianum, a rare evergreen shrub in danger of extinction due to its very limited numbers, was proposed recently by the Fish and Wildlife Service for listing as Endangered (F.R. 2/11/85). If the proposal is made final, this plant will receive all of the protection authorized by the Endangered Species Act of 1973.

Also known as the prickly-ash because of its sharp, brownish spines, *Z. thomasianum* is found only in seasonally deciduous vegetation formations that occur on limestone and on areas of volcanic origin in northern and central Puerto Rico, and on southern St. Thomas and St. John, U.S. Virgin Islands. Only about 1,050 individuals of this plant are known to exist, of which about 1,000 occur in a single locality. They are all threatened with extinction by potential habitat destruction resulting from limestone mining, urbanization, and road maintenance.

Z. thomasianum was first collected in 1880 on St. Thomas, Virgin Islands. In later years, it was found on St. John, Virgin Islands; at the summit of Piedras Chiquitas (a rocky outcrop between Salinas and Coamo, Puerto Rico); and along Road 155, just north of Coamo, Puerto Rico. Recently, it was also discovered in the upper part of the Guajataca Gorge in Isabela, Puerto Rico.

The largest existing population of the species consists of about one thousand individuals and is located on the southern coast of St. Thomas, east of Charlotte Amalie. About 25 individuals of *Z. thomasianum* can be found on St. John and only two are known to exist in the Guajataca Gorge area. The population at Piedras Chiquitas, partially destroyed by hurricane winds, consists of only two plants. The population along Road 155 was partially destroyed as a result of road improvement and maintenance activities, leaving only four individuals to survive.

Habitat modification and destruction appear to be the most serious threats to the species' survival, especially to the populations at St. Thomas, St. John, and Coamo. Plants at these sites are located on property that has a very high commercial value and good development potential. Subdivision and development of the land, unless done very carefully, could substantially modify or even destroy the habitat upon which *Z. thomasianum* depends. Habitat modification also threatens the population at the Guajataca Gorge site. Local residents use the area for planting yams, an activity that may result in the uprooting of prickly-ash plants. In addition, nearby limestone hills are mined for fill material. In order to offer limestone fill for sale, the hill where *Z. thomasianum* exists could be leveled to the ground, destroying every last individual.



Photo by Dr. José Vivaldi

Zanthoxylum thomasianum (prickly-ash)

Hurricanes have affected the prickly-ash in the past, and may still pose a threat to individual plants in such exposed areas as coastal hills. Other factors that add to *Z. thomasianum*'s vulnerability include the facts that the species is dioecious and the ratio of male to female plants is unknown. Since populations of the species are found in small, compact groups, some of them may be too small to guarantee the survival of a dioecious species.

Available Conservation Measures

If the listing proposal is made final, *Zanthoxylum thomasianum* will receive all the protection authorized by the Endangered Species Act. Conservation measures provided to species listed as Endangered under the Act include the increased

recognition of their precarious status, a requirement for the Service to conduct recovery actions, requirements for Federal protection, and prohibitions against interstate and international trafficking in this plant without a permit.

Under Section 7 of the Act, Federal agencies would be required to consult with the Fish and Wildlife Service to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the survival of any listed species by directly affecting it or its habitat. *Z. thomasianum* is not known to occur on any Federal lands at this time, but some Federal Highway Administration (FHWA) activities may have an effect on the species. In the event that highways in areas near its habitat are widened or resurfaced, a strong commitment will be needed by the FHWA to ensure protection of the species. Road designers and work crews need to be alerted so that the plants are taken into consideration before any plans for construction of nearby roads are put into effect.

A designation of Critical Habitat for *Z. thomasianum* is not included in the listing proposal. Listing alone highlights the rarity of a species and, along with the required publication of detailed location maps that are part of such a designation, the species could become threatened by vandalism or taking.

Comments on the proposal to list this species are welcome and should be sent by April 12, 1985, to the Caribbean Islands Field Supervisor, U.S. Fish and Wildlife Service, P.O. Box 3005-Marina Station, Mayaguez, Puerto Rico 00709-3005.

Brown Pelicans

(continued from page 1)

ernments, conservation organizations, and concerned individuals.

Additionally, a petition with 281 signatures to reclassify rather than delist the pelican was received from a Florida seafood company. These comments, and the Service's responses, are summarized in the February 4, 1985, final rule.

The North Carolina Wildlife Resources Commission was among those advocating a reclassification of the brown pelican from Endangered to Threatened, thus affording it continued Endangered Species Act protection. A similar response was received from the South Carolina Wildlife and Marine Resources Department. In reply, the Service pointed out that brown

pelican numbers in the Carolinas are at or above the estimated historical levels of 10,000 breeding adults. Further, both States can give the pelican continued protection under their own endangered species legislation.

Habitat loss was not a major factor in the brown pelican's original decline, and is not expected to be a problem for this bird in the future. Most breeding colonies are on low islands that appear and disappear naturally. Also, pelicans are known to make use of such artificial islands as dredge spoil sites. Much of the current breeding habitat is under Federal, State, or conservation group management, and a variety of Federal and State coastal protection laws will continue to give some additional habitat protection. The pelican itself will continue to receive protection from take or injury throughout its range by authority of the Migratory Bird Treaty Act of 1918.

San Benito Evening-Primrose Listed as Threatened

The San Benito evening-primrose (*Camissonia benitensis*), a small, hairy annual with bright yellow flowers, has been listed by the Service as a Threatened species (F.R. 2/12/85). This plant, known from only a few sites in San Benito County, California, is jeopardized by gravel mining and off-road vehicle (ORV) use.

A 1983 survey by L. M. Kiguchi resulted in a population estimate of about 1,000 individuals, an exceedingly low number for an annual plant. They occur as scattered colonies of various sizes on serpentine alluvial terraces within the Clear Creek and San Carlos Creek drainages. The San Benito evening-primrose is highly sensitive to trampling, and it has only moderate reproductive potential even under favorable conditions.

Conditions in recent years have not been favorable. Most of the plants are at two or three sites. One of the largest and most vigorous colonies, on private land near the west entrance of Clear Creek Canyon, is being destroyed by gravel mining. The others are on public property administered by the Bureau of Land Management (BLM). Most of the likely habitat on BLM land has been degraded by heavy ORV use.

Although Clear Creek Canyon is designated by BLM as an ORV recreation area, the agency has developed a management plan intended to limit ORV damage to San Benito evening-primrose habitat. Pro-

TECTIVE fences and other barriers have been placed around all but one of the colonies on public land; however, the close proximity of camping and ORV "free play" areas to the fenced sites makes protection of the plants heavily dependent upon the voluntary compliance of ORV enthusiasts. The same difficulties also limit BLM's protection of the species within the designated "Natural Area" along San Carlos Creek.

Although BLM protection by itself does not ensure the long-term survival of the San Benito evening-primrose, recent surveys indicate that the species' numbers may be increasing at several fenced sites. The Service recognizes BLM's conservation efforts, but notes that the plant's total numbers are still relatively low. Moreover, gravel mining still jeopardizes one of the largest populations, and some ORV users may not respect the enclosures. Accordingly, the Service listed the evening-primrose, but classified it as Threatened rather than Endangered (as originally proposed on October 31, 1983). BLM's comments on the proposed listing, along with those of ORV organizations, botanists, and others, are summarized in the February 12, 1985, final rule.

Available Conservation Measures

As a Threatened species, the San Benito evening-primrose will receive the

full protection of the Endangered Species Act. Federal agencies, primarily the BLM, are now required to use their statutory authorities to assist in conservation efforts for the species, and to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize its survival. For example, further development and implementation of BLM's management plan for the Clear Creek area will likely require formal interagency consultation with the Service under Section 7(a)(2) of the Act. The management plan could be written in such a way that ample protection is provided to the species without significantly reducing ORV recreation in the vicinity of Clear Creek. Non-alluvial and non-riparian areas do not provide habitat for the evening primrose; therefore, most upland areas could remain available for recreation.

The final listing rule did not include a formal designation of Critical Habitat, since pinpointing the population sites would make the species more vulnerable to vandalism; nevertheless, the plant and its habitat will receive Section 7 protection.

Among the other benefits of the listing are restrictions on interstate or international trafficking and collection of the plant on Federal lands, the requirement for the Service to develop a recovery plan, and the possibility that Federal funding may become available for California's conservation efforts for the species.

Census Technique for Endangered Big-eared Bats Proving Successful

by Fred Bagley and Judy Jacobs*

Several years ago, we began developing a recovery plan for the Ozark big-eared bat (*Plecotus townsendii ingens*) and Virginia big-eared bat (*P. t. virginianus*), Endangered subspecies of the more common Townsend's or western big-eared bat (*P. townsendii*). The Ozark big-eared bat occurs in eastern Oklahoma, northwestern Arkansas, and perhaps southern Missouri. The Virginia big-eared bat occurs in Virginia, West Virginia, Kentucky, and North Carolina.

As our efforts progressed, we became concerned with the lack of information on population trends, the lack of a standardized survey technique, and the impacts of research biologists entering active maternity colony sites. We began to wonder if it might be possible to census maternity colonies without ever entering the site. If we could come up with an accurate, yet minimally disturbing census technique, it would be possible to safely monitor population trends and evaluate the effectiveness of recovery efforts.

We thought it might be possible to count the adult female population one at a time as the bats emerged from or returned to their colony site, if they did this as a group; however, the literature on the emergence pattern of big-eareds was unclear. It was critical to the development of a survey technique to understand the emergence patterns of the species and to have some idea of how that pattern might vary as the maternity season progresses, the weather varies, and the phases of the moon change. It was also important to know the best time of the maternity season to survey the colony. If we surveyed too early, some adult females might not have arrived at the colony site; if we surveyed too late, young might have already begun to fly and their fluctuating numbers would give misleading results. And finally, it was very important to have some idea of the effect any new technique might have on the colony.

With these thoughts in mind, we set out to study nocturnal activity patterns and



Big-eared bat

seasonal population fluctuations of big-eared bats at maternity cave entrances. We observed from outside the cave with a night-vision scope, supplementing existing light with an infrared light source (provided by miner's lamps with infrared filters). With this approach, we found that, under proper lighting conditions, big-eared bats could be distinguished from

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Photo courtesy of Bat Conservation International

Big-eared Bats

(continued from page 7)

other bat species by their long ears, large size, and characteristic flight pattern. We recorded data on the number of big-eared bats that flew out of the entrance, and the number that flew in, per 10-minute interval.

Field work was conducted over 39 nights at two caves (one with a gated entrance and one not gated) in Pendleton County, West Virginia, during April–July 1982. Observations took place from dusk to dawn. Unfortunately, results at the gated cave were inconclusive, due to predation on bats by a house cat at the cave entrance and an associated decrease in the population. Therefore, the following discussion is based largely on observations made at the ungated cave:

The data revealed four distinct nocturnal activity patterns, representing stages, which changed as the maternity season progressed (Figure 1). In Stage 1 (April), big-eared bats began returning to the cave shortly after their emergence each night. Their early return was probably related to cold night temperatures and the

lack of flying insects. In Stage 2 (mid-May to mid-June), the colony's nocturnal activity pattern was characterized by emergence from the cave over a one to two-hour period just after dark. The bats remained outside the cave most of the night and returned just before dawn. We believe that the young were born during this stage and nursed during the day.

During the third week of June (Stage 3), some bats began returning to the cave immediately after the completion of the emergence. This "post-emergence return" was followed by a reemergence of many of these bats. The reemergence, in turn, was followed by a gradual return of the other bats, which accelerated sharply as dawn approached. By late June, a predawn emergence interrupted the gradual return to the cave and was promptly followed by a rapid return, concluding at dawn.

The post-emergence return is likely accounted for by a small number of young that were just beginning to emerge with the adults, but were returning sooner. It seems likely that the predawn emergence was also related to activities of the young. By late July (Stage 4), the nocturnal activ-

ity pattern consisted of a post-emergence return of roughly one-half of the colony (completed later than in June), a predawn emergence of variable size, and a great deal of "bat traffic" in and out of the cave all night long.

Population counts revealed a 22-day period in June when the population remained stable at about 250 bats. Counts in April were lower, indicating that not all of the females had yet arrived at the colony site. Counts in May were almost 20 percent above those of June's stable time period, and may reflect the presence of transient males and/or non-reproductive females in the colony that dispersed to other areas as the maternity season progressed. By June 29, a significant number of additional big-eared bats, presumably the young, were beginning to fly and the population counts were increasing. This trend continued; our last observation in late July indicated a reproductive rate of over 0.92 young per adult. This is within the expected range, accounting for some mortality before or shortly after birth, since female bats of this species normally produce one young per season.

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NOCTURNAL ACTIVITY PATTERN OF BIG EARED BATS

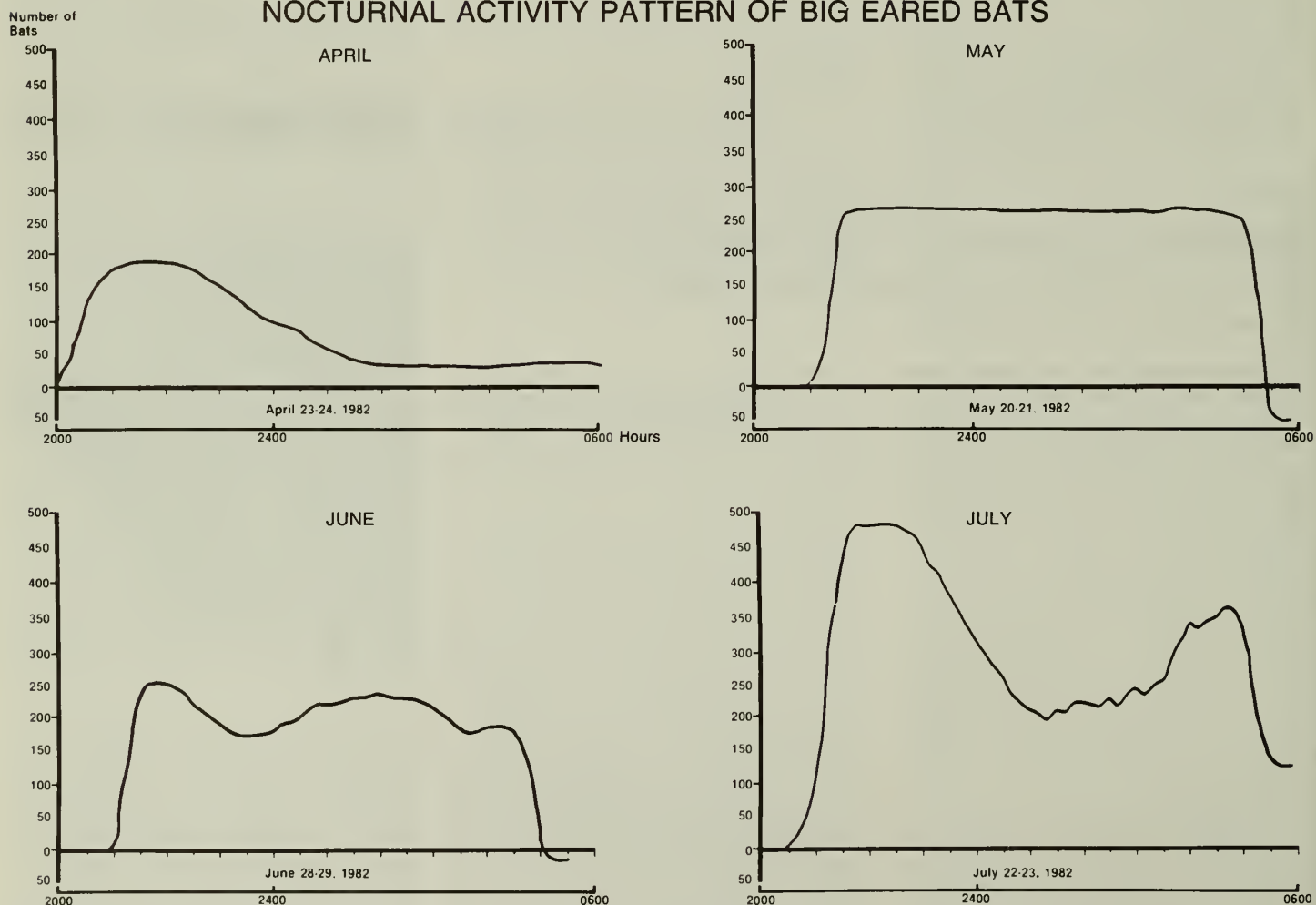


Figure 1: Four distinct nocturnal activity patterns were observed as the maternity season progressed. The slopes of the graphs indicate the net movements of the colony away from the cave (positive slope) and back to the cave (negative slope).

These observations indicate that the technique causes no abandonment, significant population reduction, or other permanent adverse effects to big-eared bat maternity colonies. The grueling all-night observations have been replaced by observing the emergence for two consecutive nights at each cave. Observations typically begin about 8:45 pm and end about 10:15 pm. This technique has been used at all big-eared bat maternity colonies for the past 2 years. The results are indicated below.

*While this work was being done, both were on the staff of the Service's Jackson, Mississippi, Endangered Species Field Station. Judy Jacobs has since transferred to the Annapolis, Maryland, Ecological Services Field Station, where she is still involved with Endangered Species Program activities.

* * *

The results of the 1984 maternity colony survey (the second of four planned annual surveys) for Ozark and Virginia big-eared bats are now available. This effort was coordinated by the Jackson Office, and was conducted by Federal, State, and private personnel in Regions 2, 4, and 5.

For Virginia big-eared bat maternity colonies, the 1984 survey indicated there were population increases at six caves, a decrease at one cave, and no change at two caves (in comparison with 1983). Overall, this represents a 10 percent increase in the population at known maternity colony sites (1983, 3505 bats; 1984, 3866 bats). The survey also identified two maternity colony sites and two bachelor colony sites in Kentucky in 1984; how-

ever, the Kentucky data are not included in this report, since these caves were surveyed too late in the maternity season to provide comparable data.

For the Ozark big-eared bat, there was an overall 9 percent decline in populations at the three known maternity colonies between the 1983 and 1984 surveys. Two of the three previously known maternity colonies declined in 1984. However, the discovery of two additional colonies in Oklahoma in 1984 resulted in an overall increase (24 percent) in the number of known Ozark big-eared bats (1983, 311 bats; 1984, 386 bats).

RECOVERY PLAN NEWS

Approved Plans for Four Puerto Rican Species

Four Threatened or Endangered species endemic to islands within the Commonwealth of Puerto Rico are subjects of recovery plans that were approved by the Fish and Wildlife Service (FWS) on April 19, 1984. With the help of these plans, prepared by Mr. Carlos A. Diaz Diaz of Puerto Rico's Department of Natural Resources, all four species may have a better chance of regaining a secure status.

Two Mona Island Reptiles

The *Mona boa* (*Epicrates monensis monensis*) and the *Mona ground iguana* (*Cyclura stejnegeri*) are both broadly distributed throughout Mona Island, a rocky limestone island located midway between Puerto Rico and Hispaniola in the Greater Antilles. Most of Mona Island is a very flat plateau, covered by outcrops of solid limestone and dominated by a dry, semi-deciduous scrub vegetation of low trees and shrubs interspersed with cacti. On other parts of the island, a thin soil layer permits tree growth in cracks, crevices, and soil pockets. As a result, the tree canopy is low and discontinuous. Along the southwestern coastal terrace, deeper soils support a more closed-canopy forest.

A nonvenomous snake that belongs to the Boidae family, the Mona boa grows to about one meter long and has a light brown body with dark brown markings. Little is known about the species' feeding habits, but anoles are thought to constitute an important part of its diet, as well as rats, mice, and bats. Only about 12 individuals of this extremely rare reptile are known to exist, all of them on Mona Island.

Because the Mona boa is a nocturnal species and exists in a spiny-vegetation environment, it may be difficult to locate. Since past and current population levels and trends are not known for certain, it is difficult to determine whether or not the species has been significantly reduced in numbers. If numbers have declined, however, the most probable cause would be the introduction of exotic mammals (goats, pigs, and cats) to the island. Goats and pigs have modified many of Mona Island's plant communities by overbrowsing and uprooting the vegetation, which has disturbed the boa's habitat. Cats are feral throughout the island and are thought to prey on the snake. A decrease in the island's bat population, a source of food for the boa, is considered another possible cause of its decline.

The Mona ground iguana is the largest lizard in the Commonwealth of Puerto Rico. This reptile measures close to 3.4 feet long, has a heavy body, a large head, and a stout, laterally compressed tail. The general color of this species is olive or olive-gray, sometimes with brown and/or blue lines. It has a dorsal crest extending from head to tail and a small horn on the snout (just in front of the eyes).

Although the iguana occurs throughout Mona Island, it is most commonly found along major escarpments and cliffside talus slopes, and less common on the southwestern coastal plain (except during the summer nesting season). The escarpments provide many retreats and a great variety of food, while the southwestern plain does not provide these conditions. However, because the plain is the only portion of Mona Island with soils deep enough for iguana nesting, gravid females migrate great



Photo by Thomas A. Wiewandt

Only about 12 individuals of the nonvenomous Mona boa are known to exist.

distances in search of favorable nesting sites there.

Cyclurid iguanas are known to be herbivorous-omnivorous. They forage mostly on the ground, although some individuals climb as far as 3 meters up onto shrubs to eat leaves. Land crabs

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Mona Island Reptiles

(continued from page 7)

and insect (coleoptera and lepidoptera) larvae are its most common animal food items. All the plant species eaten by iguanas are also eaten by goats, with the exception of a poisonous coastal plant, *Hippomane mancinella*, which is consumed by iguanas in limited quantities. The competition for food with exotic goats is thought to be one of the major threats to the Mona iguana's existence, along with the same threats posed to the Mona boa by introduced mammals. Hunting, certain agricultural and forestry practices, and some recreational activities are also responsible for *C. stejnegeri*'s declining population.

The Department of Natural Resources of the Commonwealth of Puerto Rico has managed Mona Island since 1973, protecting its wildlife and vegetation, but there have been no direct conservation efforts for either the Mona boa or the Mona iguana. On February 3, 1978, the FWS listed both species as Threatened and designated Mona Island as their Critical Habitat.

their feeding and breeding habits, as well as the effects of introduced mammals on Mona Island, will also contribute toward the goal of recovery for these two species. The study of feeding habits, in particular, may prove crucial. For example, it has already been determined that the Mona boa and feral cats both feed on anoles, and that the Mona iguana and feral goats feed on the same plants. This competition for food should be accurately assessed.

The interaction between exotic mammals and the Mona boa and iguana should be studied closely to aid in these reptiles' recovery. If proven a hazard, populations of feral mammals threatening the boa and iguana should be effectively controlled or eradicated, where feasible. It should be noted, however, that if eradication of cats, pigs, and/or goats is considered a prerequisite in determining the Mona boa and iguana as recovered, complete recovery and delisting may never be achieved. Eradication of feral mammals has proven successful in some areas (e.g., New Zealand), but difficult or impossible in



Photo by George Drewry

Bromeliads are a critical element of the golden coqui's habitat.

mountain tops, from 700 to 850 meters in elevation, at Cerro Avispa, Monte el Gato, and Sierra de Cayey where it rests on dense clusters of bromeliads growing on trees, rock edges, and the ground.

Dense bromeliad growth appears to be a critical factor in determining the presence of golden coqui populations. Frog-inhabited plants usually occur in clusters, indicating that dispersal distances tend to be short. Because of moderate rainfall and temperatures, the lands on which the coqui thrives are in great demand for agricultural development and other related purposes. Consequently, these activities represent the principal threat to the species' survival. In addition to the threats caused by loss of habitat, *E. jasperi* is also threatened by an apparently low reproductive rate, the potential for overcollecting, and its seeming inability to disperse widely.

There are no data to document an actual decline of the golden coqui population, but since the general area encompassing the species' habitat burned some years ago, some loss can reasonably be presumed. The only available estimates are those developed during a field investigation between May 1973 and August 1974, which estimated a population of fewer than 10 individuals for Cerro Avispa, 500–1,000 for Monte El Gato, and 1,000–2,000 for Sierra de Cayey. A better determination of its current status can allow for a more accurate assessment of future population trends and management needs.

Eleutherodactylus jasperi was listed as Threatened with Critical Habitat on November 11, 1977. No additional conservation measures beyond the legal protection authorized by the Endangered Species Act have been taken for the species.

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Mona iguana

Photo by C. Kenneth Dodd, Jr.

Recovery Actions

The recovery plans for both species propose to bring the populations of the boa and the iguana to levels where they are again stable, self-sustaining members of their ecosystem. The lack of information on population levels and trends for these species precludes the formulation of specific, reliable figures to determine when the populations are recovered. However, both the Mona boa and the Mona iguana probably can be considered recovered when their populations increase or stabilize during a 5 to 10-year period.

As a first step, surveys and long-term monitoring should be conducted to determine if the populations are currently stable, growing, or declining. Studies of

others (e.g., the Hawaiian Islands). The vegetation, climate, and topography prevalent on Mona Island would make such eradication an exceptionally difficult task. In the meantime, by enforcing current regulations on the island, the populations of both species will receive protection.

Golden Coqui

The golden coqui (*Eleutherodactylus jasperi*) is the only frog species in the family Leptodactylidae that is known to give birth to live young. It measures between 19 and 22 mm in total length and is olive-gold to yellow-gold in color. Endemic to Puerto Rico, this unique amphibian is restricted to a small area south of Cayey. It can be found on

Recovery Actions

The recovery plan for the golden coqui sets out to bring the population of the species to levels at which it is secure and can safely be delisted. A stable population of the coqui is considered to be a minimum of 1,000 individuals in each of its three known locations. This population level would provide a measure of protection against any catastrophic events (e.g., fires, hurricanes) that may otherwise eliminate the reduced population.

One of the most important steps toward recovery of *E. jasperi* is to protect existing populations. Any destruction or modification of the coqui's known habitat should be curtailed to maintain current population levels. Conservation of nearby areas is also important because it provides buffer zones from human disturbance. Since the golden coqui's habitat is located on private lands, protective measures such as conservation agreements, easements, land exchange, and land acquisition should be evaluated and the most appropriate alternatives negotiated. As an immediate measure, landowners should be contacted and encouraged to conserve as much habitat as possible. Once certain areas are secured, an interim management plan should be prepared for these areas.

The recovery plan also emphasizes the need for research on the biology of *E. jasperi*. Information on the breeding season, brood size, growth rate, longevity, and mortality of the species is essential to formulate an effective management strategy. Data on foraging behavior and food availability are also needed for aid in evaluating potential habitat sites and for assessing modification of known habitat. Equally as important, population surveys conducted periodically will aid in evaluating the effectiveness of recovery actions.

Puerto Rican Whip-poor-will

The Puerto Rican whip-poor-will (*Caprimulgus noctitherus*) is a robin-sized, nocturnal bird that lays its eggs on leaf litter under a bush. It can be identified by its fluffy plumage mottled with dark brown, black, and gray, a white band across its throat, and white spots at the end of its tail feathers. In the past, the Puerto Rican whip-poor-will probably occurred throughout the limestone forests of Puerto Rico, but now it is restricted to three dry semi-deciduous areas in the southwestern areas of the island: Guanica State Forest, Susua State Forest, and Guayanilla Hills. The largest population is in the Guanica State Forest where, in 1973, 400 breeding pairs were estimated to survive. The

other two populations were estimated at 100 pairs at Susua State Forest and 50 pairs at Guayanilla Hills.

The introduction of the mongoose (*Herpestes auro-punctatus*) to Puerto Rico in 1877 may be the main cause of the species' decline. Presumably, mongoose predation on *C. noctitherus* caused the bird's extirpation from the lowland moist limestone forest—an area having enough water to support mongooses. On other islands (Fiji, St. Croix, St. Thomas), mongooses have decimated many species of reptiles, amphibians, and ground nesting birds by preying upon them and their eggs. In the Virgin Islands, mongooses have contributed to the decline of the Endangered St. Croix ground lizard (*Ameiva polops*) and the probable extinction of the St. Croix ground snake (*Alsophis sancticrucis*).

The Puerto Rican whip-poor-will is estimated to survive in only about 3 percent of its former range, or only 0.7 percent of the total land surface of the island. Puerto Rico's expanding human population is a continuing threat to the remaining habitat.

On June 4, 1973, the Fish and Wildlife Service designated the Puerto Rican whip-poor-will as Endangered throughout its range. Until that point, the only other measures taken to conserve the species were the protection given to forest reserves by government laws that assured minimum habitat modification in these areas, and Law 70 of the Com-

monwealth of Puerto Rico, which protects all native wildlife.

Recovery Actions

The recovery plan for this bird emphasizes the need to obtain and refine basic data on current population levels, habitat, and other factors that may be limiting population expansion. Since 1973, no new information concerning population densities of this species has become available. Until better information is available, the whip-poor-will tentatively can be considered recovered when a population of 600 breeding pairs exists in Guanica Forest, 400 pairs in the Guayanilla Hills area, and 200 pairs in Susua Forest. In addition, there must be an assurance of long-term protection for the essential habitat needed to sustain these populations.

Put simply, the best recovery strategy for the whip-poor-will is habitat protection, especially in Guanica and Susua State Forests where conservation officers can patrol areas as needed. The FWS may ultimately have a role in ensuring protection of the essential habitat that is privately owned in the Guayanilla Hills area. Potential habitat protection measures, such as easements, conservation agreements, zoning regulations, and land acquisition or exchange, will be considered. In the meantime, private landowners should also be contacted and encouraged to protect habitat on their land.

Four San Marcos River Species

The San Marcos River begins at a series of springs along a fault zone in the City of San Marcos, Texas. Although their flows have varied over the years with fluctuations in their source, the Edwards Aquifer, the San Marcos Springs have never been known to go dry. Their uninterrupted flows, high water quality, and constant water temperature may account, at least in part, for the fact that the San Marcos Springs and River ecosystem has a greater known diversity of aquatic organisms than any such ecosystem in the region. Many of these species are found nowhere else, and now are restricted to the first few kilometers or less of the spring run.

Due to a variety of factors, including depletion of the aquifer for human uses, pollution, and alterations in the river corridor for recreation and other purposes, the San Marcos River is in danger of losing its unique biological resources. Currently, three animals and one plant native to the San Marcos ecosystem are listed by the Fish and Wildlife Service as Endangered or Threatened:

San Marcos gambusia (*Gambusia georgei*)—Due to its rarity, little is known



San Marcos gambusia

about this small (25 to 40 millimeter standard length) fish, the most imperiled of the four listed San Marcos species. Currently, the San Marcos gambusia is thought to occur in very small numbers only within an approximately one-kilometer stretch of the upper river. Its habitat needs apparently are quite specific: thermally constant flows; quiet shallow, open waters adjacent to sections moving more rapidly; a muddy, but generally not silted, substrate; partial shading from the sun; and high water quality. Any significant changes in these natural ecological conditions could result in the extinction of this species, which is classified as Endangered.

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Photo by B. G. Whiteside

San Marcos

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Fountain darter (*Etheostoma fonticola*)—This small (25 millimeter standard length), mostly reddish brown fish has a distinctive dorsal fin with black, red, and clear bands. Like the San Marcos gambusia, the fountain darter needs clean, clear water of consistent temperature; however, it also requires vegetated stream bottoms, preferably with mats of filamentous green algae (*Rhizoclonium* sp.) that it uses for cover.

The fountain darter is known from the San Marcos River and another Edwards



Photo by Robert Edwards

Fountain darter

Aquifer spring discharge, the Comal River. It was extirpated from the latter during the 1950s, due primarily to temporarily reduced flows, but a small population has been reestablished by reintroduction. Since the Comal River is only 5 kilometers in total length and has been known to periodically cease flowing, it does not comprise much of a "safety valve" for the species, and the San Marcos River ecosystem must be conserved if the fountain darter is to survive and recover. Since there are two small populations, however, this fish is listed as Threatened rather than Endangered.

San Marcos salamander (*Eurycea nana*)—This short (up to 59.6 mm total length), slender amphibian is colored light tan on its back, but it can alter its dorsal coloration to dark brown, and back again, in accord with the darkness or lightness of its substrate. A lungless species, the San Marcos salamander retains its gills and does not leave the water to metamorphose into a terrestrial form.

Data on the salamander's historical range are unclear. Currently, this Threatened species is known to occur only in Spring Lake, an unusual 40-acre impoundment formed when flows from the San Marcos Springs were dammed in the late 1800s. Most individuals are located in the northernmost section of the lake, on a limestone shelf immediately in front of the lakeside Aquarena Springs Hotel. There, concrete banks in front of the hotel and limestone boulders in adjacent shallow waters support a lush growth of the aquatic moss *Leptodictyum riparium* and mats of a coarse, filamentous blue-green alga (*Lyngbya* sp.). In view of the abun-

dance of predators (primarily fish, but also crayfish, turtles, and aquatic birds) in Spring Lake, such protective cover is essential to the survival of the salamander. A plentiful food supply for the salamander also is harbored by the aquatic vegetation.

Texas wildrice (*Zizania texana*)—Texas wildrice is an aquatic grass that forms large clones or masses firmly rooted in the river's gravel bottom. The culms and leaves usually are immersed and long-streaming in the swift current. (The species is not found in slow moving or stagnant water.) In former times, when Texas wildrice was more abundant and less subject to human disturbance, the flowering tops of the plants projected as much as a meter above the water. Today, however, flowering plants are rarely seen, and when present, do not extend very far above the surface. Since no seedlings have been observed in the native San Marcos River habitat, it is unknown whether or not the Texas wildrice can any longer reseed itself, given its low numbers and the continuing threats to its ecosystem. Accordingly, it is classified as Endangered.

Dr. W. H. Emery of Southwest Texas State University in San Marcos has worked with the Texas wildrice since at least 1975, and has had success in seed collection, seed storage and germination, seedling survival, and development of survival clones to the F₂ generation through pollenization under controlled conditions. His attempts to transplant clones of nursery-grown plants into the wild met with some temporary success. Unfortunately, however, long-term survival was prevented by factors including flooding, predation by an exotic rodent (nutria), and some recreational users of the San Marcos River who damaged the plant's fruiting heads.

Threats to the Ecosystem

Aside from their specific microhabitat needs, all four of the listed species in the San Marcos River ecosystem require an uninterrupted water supply that is clean, clear, free-flowing, and thermally constant. Any significant changes in these conditions will make the recovery effort difficult, if not impossible, and could even result in extinction. Therefore, the *San Marcos River Recovery Plan* is being treated by the Service as a *habitat* recovery plan. If the stream is conserved, it is likely that the species will survive.

Because the San Marcos Springs and River ecosystem is inextricably tied to the condition of the Edwards Aquifer, increased use of the groundwater is cause for concern. A steady growth in the human population is expected for the foreseeable future, and the Texas Department of Water Resources predicts that groundwater pumping will increase well into the 21st century. Data from the U.S.

Bureau of Reclamation suggest that future demands on the aquifer will far exceed its ability to recharge. The recovery plan cites numerous predictions that, unless steps are taken to conserve the aquifer's water supply, "the flow from the San Marcos Springs will cease around the year 2000." The implications for all aquatic life in the San Marcos ecosystem, not just for the listed species, are obvious.

The quality of the remaining water faces the same threats posed by rapid urbanization in many other areas, including the problems of occasional pollution from overloaded sewage treatment facilities, erosion and siltation, and flooding caused by uncontrolled runoff. Locally applied herbicides and pesticides also may be having unanticipated effects. For example, the Texas Highway Department has used the herbicide "Roundup" for grounds maintenance around a bridge that crosses the San Marcos River. Rainfall could easily wash this chemical into the type locality of the San Marcos gambusia. Although the effects of this substance on the four listed species are not known, it may be more than coincidental that no San Marcos gambusia have been detected at its type locality since the spraying program was initiated.

At least 10 species of introduced fishes have been detected in the San Marcos River, and some are particularly abundant. These exotics may be preying on the native fishes, out-competing them for food and territory, and spreading introduced parasites.

The Texas wildrice, which occurs within the city limits of San Marcos, faces some special problems. In 1967, Emery discussed the damage being caused by the following activities: the mowing of aquatic plants at Spring Lake to make the water more attractive to tourists, which sent masses of cut vegetation downstream and damaged the emergent wildrice inflorescences; the periodic harrowing of the river bottom to remove vegetation; the introduction and commercial harvesting of aquatic plants; the collection of native aquatic plants; and the raw sewage discharged into the water whenever the city's sewage treatment capacity was exceeded. Ten years later, Emery noted that the impacts of these factors had abated significantly but the wildrice had not been able to recover by producing new plants. The population declined even further during a 1980 flood, which swept away many of the clones and physically altered the river channel. Since the Texas wildrice seems to be particularly sensitive to chemical changes in the water, application of herbicides (such as the "Roundup" mentioned earlier) could be taking a toll.

Planned Recovery Efforts

The overall objective of the *San Marcos Recovery Plan* (approved 12/3/84) is to
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San Marcos

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ensure the long-term conservation of the San Marcos Springs and River ecosystem, which should enable the four listed species to eventually regain a secure status. Concurrently, some specific research and management activities will be necessary, particularly for the gambusia and the wildrice.

In order to assess population trends and the effectiveness of recovery actions, each of the four species must be monitored on a regular basis. For the San Marcos gambusia and the Texas wildrice, which are in the greatest danger, surveys should be conducted at least quarterly during the initial phases of the recovery program. Populations of the fountain darter and San Marcos salamander, species in a relatively more stable condition, should be monitored twice or more per year. As recovery activities progress, these schedules could be modified.

A better knowledge of the biological and ecological factors influencing the protected species is important for developing the most effective management approaches. For example, the Service believes that the relatively large number of potential predators and competitors artificially introduced into the San Marcos ecosystem is having an effect on the native species, but the severity of this threat is not clear. Research into the impacts of exotic species could provide guidance as to whether control procedures should be initiated or whether the available resources should first be concentrated on more critical problems. Basic information is needed in a number of other areas, including diseases and parasites, conditions for reproductive success, survivor-

ship patterns, and aquatic habitat characteristics.

Maintaining a healthy San Marcos ecosystem will be possible only as long as the Edwards Aquifer is not depleted. Numerous State and Federal agencies, including the Edwards Underground Water District, Edwards Aquifer Research and Data Center (EARDC), Texas Department of Water Resources, U.S. Geological Survey, U.S. Army Corps of Engineers, Bureau of Reclamation, Soil Conservation Service, and the Fish and Wildlife Service, have conducted and are continuing to conduct studies on the characteristics and functioning of the aquifer. More data are needed, however, on factors that are likely to affect the uninterrupted flow of the San Marcos Springs. Dr. Albert Ogden, of the EARDC, with support from Region 2 of the Fish and Wildlife Service, has collected preliminary data indicating that flows from the San Marcos Springs could be maintained by local natural recharge, augmented by construction of artificial recharge structures.

Without the cooperation of all agencies involved with managing use of the aquifer, recovery of the San Marcos species is remote. Any controls on groundwater pumping or requirements for water conservation would be imposed only with the concurrence of the involved local, State, and Federal agencies. The Fish and Wildlife Service and the City of San Marcos believe that conserving the San Marcos River ecosystem can, and must be, compatible with carefully managed human uses of the water. San Marcos has taken a strong initiative in protecting the river. Since the Edwards Aquifer is the main water supply for the cities of San Marcos, San Antonio, and several other cities in southcentral Texas, it obviously is

in the interests of area citizens to ensure that the aquifer does not run dry or become contaminated.

Although the San Marcos ecosystem is primarily a springrun, surface run-off from the surrounding watershed strongly influences the aquatic habitat. As urbanization increases, greater water quality problems can be expected unless measures are taken to handle stormwater and street run-off, occasional spills from the sewage treatment plant, and other sources of wastewater. Pollution from herbicides and pesticides, if found to be a threat, also will have to be addressed.

Because their numbers are so low and their habitat so restricted, the San Marcos species could be extirpated by a single catastrophic event, such as a chemical spill. As a precaution, the recovery plan advocates establishing captive populations for future use in restocking. Such a program would begin with the gambusia, which is in the greatest peril.

"Tubing," canoeing, swimming, and other forms of recreation are becoming increasingly popular along the San Marcos River. The combined impacts of these activities on the ecosystem are unknown; however, at least part of the reproductive difficulties suffered by the Texas wildrice can be traced directly to people knocking over and damaging the plant's emergent seed heads. Recreational use patterns should be documented, particularly as they relate to the wildrice flowering season, so potential management alternatives may be drawn to accommodate both recreation and conservation.

Once conservation of the San Marcos Springs and River ecosystem is ensured, and studies show that the rare animals and plants are responding favorably, reclassifications or delistings can be considered.

Regional Briefs

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During fall 1984, the Florida Department of Transportation (at the urging of the Federal Highway Administration), in cooperation with the FWS and the Florida Game and Fresh Water Fish Commission, installed four American crocodile (*Crocodylus acutus*) warning signs along State Road 905 (Card Sound Road) and U.S. 1 at North Key Largo in the upper Florida Keys. Since crocodiles are periodically hit by cars, the signs are intended to alert motorists to crocodiles crossing the highways. The first set of signs was stolen soon after installation but then replaced.

The crocodile population has steadily declined. In recent years, 15 crocodiles, ranging in size from 1.5-9 feet long, have been killed by motor vehicles. At present, approximately 100-400 adults remain, including only 20 breeding females.

The Discovery Island Zoological Park at Walt Disney World in Lake Buena Vista, Florida, reported discouragingly low reproductive success in its 1984 dusky seaside sparrow (*Ammodramus maritima nigrescens*) hybridization project. Only three dusky males remain, and all are approaching 10 years of age. A 75-percent dusky/25-percent Scott's seaside sparrow (*A. m. peninsulae*) female made five nesting attempts and produced eight eggs. One egg hatched and the young bird fledged, but was found dead with a broken neck in its cage in early September. A 50-percent female made seven nesting attempts and produced 20 eggs, of which five hatched. Only one hatchling survived (75-percent dusky), which will be used in the 1985 breeding program.

Proposed modifications to an existing U.S. Army Corps of Engineers drainage/flood control project in south Florida will affect Critical Habitat for the Endangered Cape Sable seaside sparrow (*Ammo-*

spiza maritima mirabilis). One aspect of the changes that are being considered would restore a more natural hydrologic regime to 20,000-30,000 acres of wetlands, which includes several thousand acres of Critical Habitat, and it is quite possible that this wetland restoration could adversely modify the sparrow's Critical Habitat. The same area is concurrently designated as Critical Habitat for the American crocodile (*Crocodylus acutus*), which will likely benefit from the proposed restoration.

The Habitat Evaluation Procedures (HEP) developed by the FWS are being studied as a technique for more detailed definition of habitat quality and to assist in predicting post-project conditions. This project, which may also affect the Endangered wood stork (*Mycteria americana*), emphasizes the liabilities and implications of single species management as a tool in recovery of listed species.

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Changes in Research Publications

Beginning early in 1985, the Fish and Wildlife Service is revising the titles, content, and format of the following Research and Development publications:

The series *Wildlife Leaflet* will be renamed *Fish and Wildlife Leaflet*. Two other series, *Research Report* and *Research Report—Wildlife*, are being combined under a new title, *Fish and Wildlife Research*. The *Technical Papers* and *Special Scientific Report—Wildlife* series will be consolidated into the *Fish and Wildlife Technical Reports*. All of the above will include fisheries as well as wildlife topics. *Fisheries and Wildlife Research*, an unnumbered annual report, has already been retitled *Fisheries and Wildlife Research and Development*, and the *FWS/OBS* series will be retitled *Biological Reports*.

Further information on these publications is available from the Editorial Office, U.S. Fish and Wildlife Service, Aylesworth Hall, Colorado State University, Fort Collins, Colorado 80523.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	20	19	234	4	0	22	299	22
Birds	59	13	144	3	1	0	220	54
Reptiles	8	6	60	8	4	13	99	15
Amphibians	5	0	8	3	0	0	16	6
Fishes	30	4	11	14	3	0	62	37
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	4	0	0	12	9
Plants	67	5	1	10	2	2	87	34
TOTAL	225	47	461	52	10	37	832	203**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 169

Number of species currently proposed for listing: 31 animals
37 plants

Number of Species with Critical Habitats determined: 68

Number of Cooperative Agreements signed with States: 41 fish & wildlife
16 plants

February 28, 1985

Regional Briefs

(continued from page 11)

In an even job trade, Marshall P. Jones has taken over as chief of the Region 4 Endangered Species Office, and Alex B. Montgomery has switched with Marshall to become Regional Planning Coordinator. Marshall had previously worked as coordinator of listing in the regional office and before that held a variety of jobs in the Washington Office of Endangered Species, including the job as first editor of the BULLETIN. Alex, who has been the Regional Endangered Species Office chief since 1976, will now be responsible

for coordination of regional resource planning for all FWS programs, as well as State comprehensive planning under the Federal Aid Program.

Region 5—New York State biologists have recently discovered a new Indiana bat (*Myotis sodalis*) hibernaculum in an abandoned mine. Approximately 3,400 of these Endangered bats were found hibernating in this newly discovered shelter.

Region 7—Endangered species biologists Skip Ambrose and Michael Amaral presented papers at the raptor session of a conference and workshop on Alaska

birds held recently in Anchorage. Skip summarized peregrine falcon (*Falco peregrinus*) studies conducted in Alaska from 1979–1984. Mike reported on the cliff-nesting birds of prey along the Canning and Kongakut Rivers, and compared the nesting density of birds along ten major Alaska rivers. Abstracts of the more than 50 papers presented at the conference will be published later. The conference was sponsored by the Alaska Department of Fish and Game, the National Audubon Society, the University of Alaska, the Bureau of Land Management, the National Park Service, the U.S. Forest Service, and the Fish and Wildlife Service.

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Eight Plants Proposed for Listing as Threatened or Endangered

During March, eight plant taxa were proposed by the Service for addition to the List of Endangered and Threatened Wildlife and Plants. All eight are native to small sites in different parts of the United

States, where they face habitat damage and other threats. If the proposed lists are made final, these plants will receive protection under the Endangered Species Act:

Mauna Kea silversword

One of the Hawaiian Islands' most impressive and well-known plants is the silversword, or '*ahinahina*'. The most famous variety is *Argyroxiphium sandwicense* var. *macrocephalum*, which grows high on the volcano Haleakala, Island of Maui. Another variety, found on the upper slopes of the Island of Hawai'i's highest volcano, Mauna Kea, is extremely rare and in danger of extinction. Only about 35 individuals of the Mauna Kea silversword (*A. s.* var. *sandwicense*) survive, out of a population that presumably once numbered in the thousands, and it has been proposed for listing as Endangered (F.R. 3/6/85).

Historically, the Hawai'i variety occupied the alpine slopes of the Mauna Kea volcanic dome within the 8,500–12,000 foot level, mostly above the tree line and in barren desert areas above other vegetation. (There are unconfirmed reports that it once may have occurred on one of the island's other volcanic mountains, Hualalai.) The taxon was first scientifically collected in 1825 by Scottish botanist James Macrae, who wrote that it was "truly superb, and almost worth the journey of coming here to see it on purpose." As recently as about 50 years ago, the Mauna Kea silversword was so abundant that one man who climbed the mountain told others that "his eyes glared in the morning sun" from the sunlight reflecting off the plants in the upper Wailuku River basin. It is this same area of the mountain that maintains the last few surviving Mauna Kea silverswords.

The introduction of various livestock animals to the Hawaiian Islands in the late 1700s had severe consequences for the native flora. Feral goats, sheep, pigs, cattle, and horses multiplied and dispersed widely throughout the islands. These animals have virtually eliminated the Mauna Kea silversword, and have vastly altered

(continued on page 4)

Recovery Plan Approved for Two California Butterflies

A plan developed to assist in the recovery of two Endangered butterflies, the San Bruno elfin and the mission blue, has been approved by the Service (10/10/84). With the aid of this recovery plan, these two species may once again become secure and self-sustaining.

At one time, the San Bruno elfin (*Callophrys mossii bayensis*) and mission blue (*Icaricia icarioides missionensis*) butterflies probably occurred on hill tops and ridges throughout much of northern San Mateo County to the San Francisco Peninsula and northward to southern Marin County in California. Urbanization of this region has significantly reduced the range of both species to relicts of their former abundance, except at San Bruno Mountain in northern San Mateo County, where suitable habitat exists for at least seven colonies of the San Bruno elfin butterfly and almost all extant mission blue butterfly colonies. In addition to San Bruno Mountain, other colonies of the San Bruno elfin occur on Milagra Ridge, Montara Mountain, Peak Mountain, and Whiting Ridge, also in San Mateo County.

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The Mauna Kea silversword produces a globular rosette that can reach 2 feet (61 centimeters) or more in diameter, consisting of lance-shaped leaves covered with long silvery hairs. Its flowering stalk, which can grow up to 8 feet (2.4 meters) in height, supports numerous branches bearing small flowering heads. After flowering, plants with a single rosette die.



Only four colonies of the San Bruno elfin are known to exist, all of them in the coastal mountains of San Mateo County, California.

Photo by Larry Orsak



REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of March:

Region 1—The Fish and Wildlife Service (FWS) held several meetings with Bu-

reau of Land Management (BLM) biologists to discuss a habitat protection plan for the Bruneau Hot Springs snail (genus and species undescribed), a Category 1 candidate species in Idaho for which a listing proposal is under review. Dr. Fritchman, an invertebrate zoologist with

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the biology department of Boise State University, has been to the site, collected specimens, and is culturing them in the lab. Possible sites for relocating the snails into secure habitats are being investigated. A meeting with U.S. Geological Survey and Idaho State hydrologists revealed that the aquifer feeding the hot spring is being drawn down by ground water pumping for agricultural use and that the spring would become dry at some future date. Survival of the snail does not look good unless other secure habitats can be found or existing agricultural practices modified.

* * *

Region 2—The 1985 Crane Workshop was held March 26–28 at Grand Island, Nebraska. Dr. James Lewis, Whooping Crane Coordinator for the FWS, and John VanderWalker of the Platte River Trust co-chaired the meeting. Fifty-three professionals from Canada and the United States presented research papers on the topics of populations, habitat, management, disease and mortality, captive propagation, behavior, hunting, reproduction, and aspects of migration. Twenty-three papers dealt with whooping crane (*Grus americana*) subjects, four were about the Endangered Mississippi sandhill crane (*Grus canadensis pulla*), and the remaining papers dealt with the non-endangered sandhill cranes used as surrogates for research. The participants toured crane habitat along the Platte River and the Rainwater Basin of Nebraska, viewing thousands of cranes, geese, and ducks. The Whooping Crane Recovery Team met after the workshop to complete revisions on the 1980 recovery plan.

* * *

A female Sonoran pronghorn (*Antilocapra americana sonoriensis*), one of 10 that were captured and radio-collared by the Arizona Game and Fish Department in 1983, was found dead on the Cabeza Prieta National Wildlife Refuge in early March. Analysis of the carcass by personnel at the University of Arizona's animal pathology laboratory indicates that the pronghorn may have been killed by a coyote (*Canis latrans*). The carcass will eventually be sent to the Natural History Museum in Washington, D.C., for preservation and possible display. This is the second of the collared pronghorns to die over the 2-year period that the monitoring effort for this Endangered mammal has been in effect.

* * *

An Endangered bonytail chub (*Gila elegans*) was captured from Lake Mohave by contractors with Arizona State University. The fish was rushed to Page Springs State Hatchery in Arizona, and it will eventually join the Endangered fish breeding program at Dexter National Fish Hatchery (NFH) in New Mexico. This is only the 19th bonytail chub to be captured

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REGIONAL BRIEFS

(continued from page 2)

in the lower basin of the Colorado River over the past 10 years. The others all came from Lake Mohave, too, and were placed in Dexter NFH, where successful spawning procedures have been developed. Eventually, the FWS plans to reintroduce this species into portions of its former range under the experimental population regulations finalized on August 27, 1984.

The Lake Mohave bonytail chub population apparently has survived in that reservoir of the Colorado River since Davis Dam was built in the early 1950s. The youngest chub discovered so far was 37

years old, and most are more than 40 years old. Although the reservoir habitat allows survival of adult fish, requirements for spawning are lacking, resulting in a rapidly disappearing senescence population. Expansion of introduced striped bass (*Morone saxatilis*) in Lake Mohave may eliminate the few remaining chubs even before old age.

* * *

Region 4—Section 7 formal consultation between the FWS and the U.S. Forest Service (USFS) has recently been completed with the issuance of a "no jeopardy" biological opinion. The USFS agreed to incorporate into their activities various management guidelines for the Endangered red-cockaded woodpecker

(*Picoides borealis*) that should ensure the continued welfare of this species on USFS lands in the Southeast. The guidelines are very similar to those outlined in the revised draft of the Red-cockaded Woodpecker Recovery Plan.

* * *

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Correction

In BULLETIN Vol. X No. 3, the photo caption on page 1 should have described all three pelicans shown as immatures. Our apologies to the photographer, who is not responsible for the caption.

Protection Given to Three Desert Fishes

Three subspecies of desert fishes were listed by the Service during March as Threatened. All three are endemic to small springs systems, and are vulnerable to any activities that might deplete or degrade their aquatic habitat. Under their Threatened classification, these fishes and their habitat will now receive the protection and recovery programs authorized by the Endangered Species Act:

The **Hutton tui chub** (*Gila bicolor* spp.) is found only in Hutton Spring and a nearby unnamed spring, both located in arid Lake County, south-central Oregon. This fish was proposed for listing as Threatened on April 17, 1984 (see BULLETIN Vol. IX No. 5), due primarily to threats thought to be posed by the side effects of heavy cattle grazing and by chemical contamination of the water table. It now appears that current grazing practices are not degrading the aquatic habitat; however, if the property is later sold to people who might be less interested in conservation than the current owners, water quality could suffer. Other future threats could include excessive ground water pumping or springflow diversion.

A long-term, but potentially more serious, threat to the Hutton tui chub is chemical contamination of the ground water that feeds the springs. A toxic waste dump is located less than 2 miles from Hutton Spring in the now-dry Alkali Lake. During 1976, about 25,000 55-gallon drums of 2,4-dichlorophenoxyacetic acid (or 2,4-D) and methylchlorophenoxyacetic acid (MCPA) manufacturing residues were buried along the southwest margin of the lake. The barrels were severely damaged when initially buried, and have since polluted the ground water, surface water, and air in the Alkali Lake area. Dispersal of these herbicides and their by-products may result in the extinction of the Hutton tui chub unless measures are undertaken to prevent contamination of its habitat.

The **Foskett speckled dace** (*Rhinichthys osculus* spp.) also occurs in Lake County, Oregon, within Foskett Spring and its outflow. It may also be found in a small springpool to the south where a transplant was attempted in 1982. Like the Hutton tui chub, this variety of the speckled dace could be threatened by future increases in grazing and water use. The vulnerability of the Foskett Spring habitat is accentuated by its small size and very restricted flow (less than 0.5 cubic feet per second). It was proposed with the Hutton tui chub (F.R. 4/17/84) for listing as Threatened (see BULLETIN Vol. IX No. 5).

The **Big Spring spinedace** (*Lepidomeda mollispinis pratensis*) is a small fish restricted to the intermittent Meadow Valley Wash in southern Nevada. It was first collected in the 1930s from a marshy area adjacent to Big Spring, which is near the town of Panaca. In 1959, however, ichthyologists discovered that diversion of water for agriculture and the introduced mosquitofish (*Gambusia affinis*) had apparently eliminated the Big Spring spinedace from its type locality, and the subspecies was thought to be extinct.

Fortunately, Nevada Department of Wildlife (NDW) biologists rediscovered the spinedace at a site in Condor Canyon, a 4-mile (6.4-kilometer) section of Meadow Valley Wash just northeast of Panaca that has perennially flowing water. A reintroduction of the spinedace above a barrier falls was later conducted by NDW, and now the fish occurs in most of the available Condor Canyon habitat. Since the stream is shallow and only 3 feet (0.9 meters) wide in most places, it is particularly vulnerable to reduced or even lost flows from groundwater pumping or channelization and diversion. Overgrazing of the riparian vegetation along its banks could result in siltation, increases in water temperatures, and changes in dissolved oxygen levels. Aside from these threats to

its habitat, the spinedace itself would be imperiled if exotic fishes become established in Condor Canyon. For these reasons, the Big Spring spinedace was produced for listing as Threatened on November 30, 1983 (see BULLETIN Vol. VIII No. 12). A Critical Habitat designation for the 4 stream miles in Condor Canyon and a 50-foot (15.24 meter) riparian zone along each side was proposed at the same time.

The Nature Conservancy owns some of the habitat at the head of Condor Canyon, but about 3.25 miles (6 km) of the canyon are administered by the Bureau of Land Management (BLM). About one-half of the Critical Habitat is within BLM grazing allotments, which currently are in a non-use status. Any federally authorized reactivation of the allotments would probably require consultation with the Fish and Wildlife Service in order to prevent adverse modification of the Critical Habitat.

* * *

Under their Threatened classification, the Hutton tui chub, Foskett speckled dace, and Big Spring spinedace are now protected by the Endangered Species Act. Among the conservation measures conferred by the Act are protection against any adverse effects of Federal actions, a requirement for the Service to develop a recovery plan, possible Federal aid to State conservation activities for these fishes, and controls on taking.

Included in the final listings were special rules authorizing the take of all three fishes for certain conservation purposes, in accordance with State laws. These special rules should allow for more efficient conservation and recovery activities. Habitat degradation, rather than intentional taking of the fishes, is the primary threat to their survival. Both Oregon and Nevada already prohibit the take of these fishes without a State-authorized scientific collecting permit.

Blue Ridge Goldenrod Listed as Threatened

A perennial herb endemic to the high mountain peaks in North Carolina and Tennessee, the Blue Ridge goldenrod (*Solidago spithamea*), has been listed by the Service as a Threatened species (F.R. 3/28/85). Habitat disturbance as a result of recreational development and use has reduced *Solidago spithamea* to just three populations, but now with the protection authorized by the Endangered Species Act to aid in its conservation, the species will have a better chance for survival.

Two of the remaining populations of *Solidago spithamea* occur on private lands in Avery County, North Carolina, and the third grows in a national forest located on the border between Mitchell County, North Carolina, and Carter County, Tennessee. Heavy recreational use by hikers, rock climbers, and sightseers continues to threaten the re-

maining populations of the Blue Ridge goldenrod, and construction of new trails and other related improvements at any of the three sites where the species occurs could further jeopardize its existence.

On July 23, 1984, the Service proposed to list *Solidago spithamea* as Threatened (see BULLETIN Vol. IX No. 8) and solicited comments on its status, distribution, and threats to its existence. Comments were received from seven parties comprised of Federal and State government agencies and private conservation organizations. All comments supported the Service's decision to list the species, and most agreed that the decision not to designate Critical Habitat was the proper one, considering that such a designation could prove detrimental to the species.

As a Threatened species, the Blue Ridge goldenrod will now be entitled to all the conservation measures provided to

species listed under the Endangered Species Act. These include recognition of its precarious status, development of plans for its recovery, and prohibitions against certain practices. Under Section 7 of the Act, Federal agencies are required to consult with the Fish and Wildlife Service to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the survival of any listed species. Even though a formal designation of Critical Habitat is not part of this final rule, *Solidago spithamea* will nevertheless receive this full Section 7 protection. In addition, interstate and international trafficking in this plant without a permit is now prohibited, with certain exceptions. However, properly documented seeds of cultivated specimens are exempt from this prohibition.

Condor Setback

Recent observations of the critically Endangered California condor (*Gymnogyps californianus*) indicate a drop in the number of breeding pairs remaining in the wild.

Nesting activity should have begun several months ago, and biologists at the Condor Research Center in Ventura, California, have observed only single adult condors in the territories of three pairs that nested in 1984. At a fourth territory, one member of the breeding pair is missing, but its mate has apparently formed a new pair bond with another bird. These birds were observed copulating early in the breeding season, but in recent weeks only the male has been seen. At the fifth site, the breeding pair has pro-

duced two eggs so far this season. Both eggs were collected for artificial incubation to supplement the captive population. One embryo died, but the other egg hatched on April 11. The chick's sex will be determined in several weeks.

On April 9, a severely emaciated, barely alive male condor (which was not one of the missing breeding birds) was found by a rancher, and was turned over to Condor Research Center biologists the next day for care. Unfortunately, it quickly died. The bird showed no external signs of trauma and there was no lead in its gizzard. Tissue samples have been submitted to various laboratories for analysis to see if there were any diseases or toxic substances present that would cause the bird's death. Biologists are concerned that the missing birds, which may number as many as six, reduce the wild population to as few as 9 birds. A final count of the 1985 population will be made in Septem-

ber when distinct feather patterns are apparent, allowing biologists to identify individual birds.

Only one of the four missing breeding condors had been fitted with a radio transmitter, and it is not sending a signal. Given the vastness of the condor's range, this lack of tracking ability will make it difficult for researchers to locate the carcasses (if in fact the missing birds have died) and determine the causes of death. The California Condor Recovery Team—made up of Federal, State, and private biologists—is reviewing the condor's current status, and will recommend whether or not the planned recovery effort for this great bird needs any modification.

The captive population numbers 17 condors, all but one of them (the male Topa Topa) too young for breeding. Biologists hope that this population will eventually produce offspring that can be introduced into the wild.



Each flowering head on a Mauna Kea silversword measures about one inch (2.5 cm) in diameter, and is ringed by about a dozen pinkish, petal-like ray flowers.

Eight Plants

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and degraded the mountain's vegetation in general. Their direct effects include trampling and other mechanical damage to the plants, browsing of plant material, and dispersal of exotic competing plant species. Secondary effects include wind and water erosion of the thin soil mantle after it has been stripped of stabilizing vegetation.

Currently, the Mauna Kea silversword survives in an area measuring only 50 meters by 500 meters (about 165 feet by 1,650 feet) in the upper Wailuku River drainage. A portion of the population has been fenced by the State of Hawaii; unfortunately, however, the enclosure has

not been effective against the mouflon sheep, an animal introduced for sport hunting. This exotic threatens the remaining silverswords through trampling and browsing.

Most of the remaining 35 plants occur on undeveloped land held in trust by the Hawaiian Homes Commission, part of the property (known as the Hawaiian Home Lands) set aside in 1920 for the benefit of the native Hawaiian people. The rest are on land owned by the State of Hawaii, which has taken some preliminary steps for the species' protection. Almost all of the species' historical range is on State-owned property.

The listing proposal did not include a designation of Critical Habitat because.

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pinpointing the silversword's location would make this distinctive plant more vulnerable to overcollection or vandalism; however, if listed, the species will receive the benefits authorized by Section 7 of the Endangered Species Act. Moreover, in accordance with Hawaiian law, listing the silversword under the Federal Endangered Species Act automatically would give it protection from take under the State's own endangered species legislation.

Comments on the proposal to list the Mauna Kea silversword as Endangered are welcome from all interested agencies, organizations, and individuals, and are due to the Regional Director, Region 1 (see page 2 of the BULLETIN for the address), by May 6, 1985.

Lana'i sandalwood

Another rare plant endemic to the Hawaiian Islands, the Lana'i 'iliahi or sandalwood (*Santalum freycinetianum* var. *lanaiense*), is imperiled primarily by the effects of exotic game animals and rat predation on its fruits. At last count, only 39 individuals of this variety survived, and it has been proposed for listing as Endangered (F.R. 3/6/85).

This small, gnarled tree has leaves that are dark green above with red veins, and its bright red flowers are borne in small clusters. It may have been one of the native Hawaiian sandalwoods that were extensively cut for trade from 1790 to 1820. (Sandalwood is valued for its fragrance and beauty, and was used in making incense and in decorative woodworking.) Although the Lana'i variety is no longer common enough for profitable commercial exploitation, it remains vulnerable to individuals that might seek the wood.

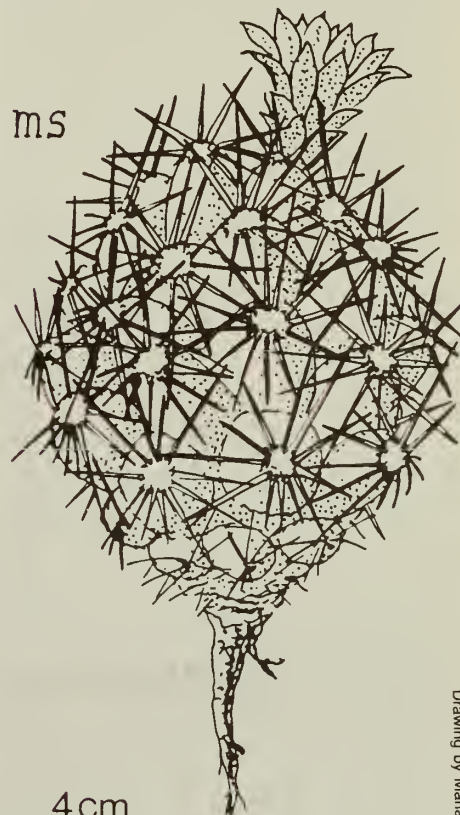
The tree is found in a variety of habitat types on the Island of Lana'i, from dry lowland forests to mesic forests at higher elevations. Although the variety once may have occurred over a wider range, the 39 remaining individuals of the Lana'i sandalwood can be divided into two populations, one near Kanepu'u and the other near the summit of the island. Both populations are on private lands owned by Castle and Cook, Inc.

Although the sandalwood trade likely had an effect on Lana'i sandalwood numbers, the more recent decline can be traced largely to modification and destruction of its natural habitat. Agricultural development has resulted in the loss of large areas of native vegetation, first for pastures and then for pineapple production. Cattle, sheep, and axis deer, all of which were introduced onto the island, have trampled and consumed much of the vegetation on non-cultivated areas, contributing to severe wind erosion of the soil. In earlier years, the erosion problem was so bad that whaling ships reported seeing large dust clouds coming from the island.

The Lana'i sandalwood itself is eaten by introduced browsers, including the axis deer that are maintained for hunting, as demonstrated by the high browse line on the remaining trees. Reproduction in this plant has been virtually halted by other predators—accidentally introduced rats—that consume the fruits and seeds. In fact, only one sapling has been observed recently.

Due primarily to these threats and to the sandalwood's low numbers, the Service believes that the Lana'i sandalwood is in need of Endangered Species Act protection. The listing proposal did not include a designation of Critical Habitat, since pinpointing the sites of the known populations would make this valued tree vulnerable to illegal harvesting. If listed, however, the sandalwood will receive protection from adverse effects of any Federal activities. At this time, no such impacts are anticipated. As is the case with the Mauna Kea silversword, listing the Lana'i sandalwood under the Federal act will make it illegal under Hawaii's own endangered species law to take this tree.

Comments on the proposal to list the Lana'i sandalwood as Endangered are welcome, and should be sent to the Regional Director, Region 1, by May 6, 1985.



The Cochise pincushion cactus is a small, unbranched species. Its bell-shaped flowers are pale yellow-green with a slight bronze cast.

Cochise pincushion cactus

The Cochise pincushion cactus (*Coryphantha robbinsorum*) was first collected by James, Jimmy, and John Robbins in 1976, and was named for them later that year by botanist W.H. Earl. Until recently, it was known only from several isolated hills in the semidesert grasslands of Cochise County, southwestern Arizona. In late 1984, however, a population was discovered in adjacent Sonora, Mexico.

Little is known thus far about the status of the Sonoran population, but the Arizona plants are vulnerable to extirpation. Surveys have located a total of only 88.8 acres (approximately 40 hectares) in Cochise County that are occupied by the plants. The colonies are situated on hills scattered within an overall area of 4 to 6

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Lana'i sandalwood

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square miles (2.5 to 3.7 square kilometers). The entire known range in Arizona is on an active cattle range that includes privately owned land and State lands leased for grazing. Although the ranch owners are conservation-oriented and grazing currently is not a serious problem for the cactus, a change in ranch ownership and/or grazing practices could lead to rapid deterioration of the habitat. Cattle do not intentionally graze the cacti, but they can trample the small plants and cause soil erosion. One of the colonies is immediately adjacent to a livestock water source.

Exploration for oil in the area is another potential threat to the species. At least one well was drilled in about 1976, and the access road passed through a Cochise pincushion cactus site. Although no oil was found, exploration continues. The current ranch owners do not own the mineral rights to the area.

Collecting from the wild may ultimately be the most serious threat to the species' survival. The relatively recent discovery, attractive appearance, and rarity of the Cochise pincushion cactus make it desirable for some private collectors and potentially valuable for the commercial trade. Recent information from A.D. Zimmerman indicates that more than one-half of the species' total Arizona population is concentrated on less than 4 percent of its known habitat. If illegal collectors locate this colony, they could reduce the cactus population to such a low level that it might be unable to recover. Zimmerman reports that the Cochise pincushion already has a much lower reproductive potential than most other cacti.

The Arizona Native Plant Law includes all members of the cactus family on its list of protected plants. They may be collected only with a State permit and the permission of the landowner; however, the law provides no protection against habitat loss or incidental take, which are major risks to the species.

Although the status of the Sonoran population of the Cochise pincushion cactus is uncertain, it presumably faces threats similar to those jeopardizing the Arizona population; therefore, the species has been proposed for listing as Threatened throughout its entire range (F.R. 3/6/85). Because pinpointing the population sites with a map and detailed habitat description would make the cactus even more vulnerable to collection, the listing proposal did not contain a designation of Critical Habitat. Nevertheless, the species will receive protection from any adverse effects of Federal activities. Restrictions in interstate and international trade also will apply.

Comments on the proposal to list the Cochise pincushion cactus as a Threatened species are welcome, and should be sent to the Regional Director, Region 2 (address on page 2) by May 6, 1985.

Fragrant prickly-apple cactus

One of Florida's native columnar cacti, the fragrant prickly-apple (*Cereus eriophorus* var. *fragrans*), gets its common name from its strongly scented nocturnal flowers, its heavily spined stems, and its round, dull red fruits. This variety is positively known historically from only two locations along the west coast of Florida near Port St. Lucie and Malabar. Based on recent field work by Florida botanists, however, the Malabar population no longer exists. The cactus has been proposed for listing as Endangered (F.R. 3/6/85).



Stems of the fragrant prickly-apple cactus can reach lengths of up to 5 meters (16.4 feet). Although they usually grow upright at first, longer stems often sprawl over the surrounding vegetation.

A survey by Fish and Wildlife Service personnel, using the field notes of Dr. Daniel Austin (Florida Atlantic University), located only 14 plants at the Port St. Lucie site, all on a single sandy ridge about 12 square acres (4.86 square hectares) in size. Fortunately, however, a private landowner recently reported a probable additional population of about 200 plants located about one mile away.

Due to its extremely small size, the Port St. Lucie population of the fragrant prickly-apple could, like the Malabar population, become extirpated. Rapid urbanization in central Florida is resulting in inadvertent modification or destruction of the native coastal hammock habitat required by the cactus. Further threats come from off-road vehicle (ORV) use; the August 1984 survey revealed ORV tracks within 50 feet (15.24 meters) of the cactus at one section of the Port St. Lucie site.

Like many other rare cacti, the fragrant prickly-apple may be in demand by some collectors of unique species and lucrative to commercial dealers that seek to satisfy that demand. An area near the Port St. Lucie population has been extensively dug up by shovel and, while there is no proof, there is at least a possibility that some of the plants have been removed. Because of the potential threat to the plant from collectors, the Service decided not to publicize the population site by publishing a designation of Critical Habitat with the listing proposal. The site is privately owned.

Under Florida law, it is illegal to take without landowner authorization, transport, or sell the fragrant prickly-apple, but the State law does not provide for protection of the plant's habitat. If it is listed under the Federal Endangered Species Act, however, the prohibitions against Federal actions that would harm the plant or its habitat will apply. Interstate and international trafficking in the species also will become illegal.

Comments on the proposal to list the fragrant prickly-apple as Endangered are welcome, and should be sent to the Field Supervisor, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207 by May 6, 1985.

Two Florida Mints

Another two Florida plants have been proposed as Endangered (F.R. 3/29/85), *Dicerandra frutescens* (scrub balm) and *Dicerandra cornutissima* (longspurred balm). Both are members of the mint family. Rapidly expanding commercial and residential development in central Florida has been detrimental to these species in the past and still poses a severe threat to their survival.

Dicerandra frutescens is a strongly aromatic plant that grows up to 1.6 feet (0.5

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Photo by Andy Robinson

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meter) tall with erect non-woody shoots growing from a woody base. Its small leaves are narrowly oblong with blunt tips, and occur opposite one another on the stems. Flowers are borne in pairs, tubular in shape, and white or pale pink with purplish-rose dots in color. This plant is endemic to Highlands County, Florida, where it is known from two privately-owned areas. It occurs in the Southern Central Florida Ridge Sandhill geographical province and in sand pine communities, growing primarily on well-drained fine sand soils.

Apparently, *D. frutescens* has always been rare and confined to a small region in Highlands County. Today it is known from near Lake June in Winter, where it was first collected in 1925, and from the Archbold Biological Station, a privately funded research facility. In the Lake June in Winter area, the species' current sites are surrounded by developments along U.S. Highway 27. The habitat of *D. frutescens*, located in the pine scrub community near the highway, is prime property for further development. The populations that occur at the Archbold Biological Station are largely in areas undisturbed by humans except for vehicular traffic on the fire lanes. Continuation of the species here depends on successful implementation of a prescribed burning program by the Archbold staff.

Dicerandra cornutissima is very similar in appearance to *D. frutescens*, but the two are readily distinguishable upon close examination. *D. cornutissima* has narrower leaves, purple-rose flowers with deep purple markings, and flowers that are borne in groups rather than in pairs. Both species exude the same strong, pleasant, minty smell.

D. cornutissima has probably always been a rare plant, too. At one time, it occurred in Sumter and Marion Counties. Now, however, it is known from only a single area in Marion County, where it is found in sand pine or oak scrub and in the ecotones between these and turkey oak communities. This area, 11 miles southwest of Ocala, Florida, is currently being developed and, if Federal protection is not provided, the few remaining plants could be eliminated. Several sites where the species formerly occurred, both in Sumter and Marion Counties, have been lost to commercial and residential development already. Peninsular Florida has one of the highest population growth rates in the United States, and development pressures on the limited areas in which both *D. cornutissima* and *D. frutescens* still occur can only be expected to intensify over the next decade.

Factors that make both species even more vulnerable are their high visibility

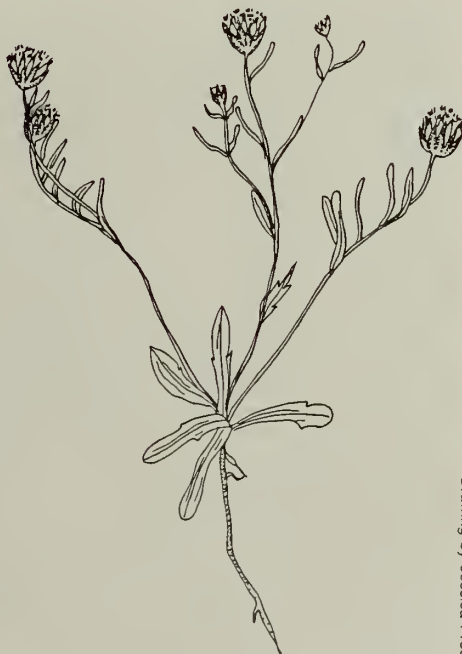
and their easy identification by the public, especially due to the strong, aromatic odor common to members of the mint family. Both plants occur in close proximity to public highways, and easy access could intensify the threats from vandalism and taking. Due to these factors, Critical Habitat was not proposed for either species.

Comments on the proposal to list *D. frutescens* and *D. cornutissima* as Endangered species are welcome, and should be sent by May 28, 1985, to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207.

Hymenoxys texana

Hymenoxys texana, a member of the aster family, is a small, single-stemmed annual that reaches up to 10 centimeters (3.9 inches) tall. Its flower heads are yellowish, 4–6 millimeters (0.16–0.23 inches) tall, and can be seen during late March through early April. The species grows in poorly drained swales or depressions in open grasslands with very few other plants.

H. texana was first collected around 1879 in an area of southwest Texas between the Nueces and Frio Rivers. This population seems to be extirpated and only three other populations are currently known to exist, all near Houston in Harris County, Texas, in the northern part of the Gulf Coastal Prairie. Two of the existing populations are on private property near a housing development, and the other is located on public land adjacent to a county road right-of-way. The species' entire known range totals only about 1,600 square feet (490 square meters).



Hymenoxys texana

All three populations of *H. texana* are now being threatened by habitat destruction as a result of housing and road development. A portion of one population has already been destroyed by construction during the enlarging and paving of a county road. Since it is the policy of Harris County to maintain and improve county roads as needed, this species could be severely damaged or even destroyed unless there is proper planning to ensure its protection. In addition to road improvements, anticipated increases in housing construction in the area may completely eliminate the few remaining populations of *H. texana*.

Currently, there are no State or Federal laws or regulations to protect *Hymenoxys texana*. To provide protection for this declining plant, the Service has proposed to list it as an Endangered species (F.R. 3/6/85). The listing proposal did not include a designation of Critical Habitat since publicizing the sites could subject the plant to collecting or vandalism. This species is not known to occur on Federal lands, and no Federal involvement with it is known or expected.

Comments on the proposal to list *H. texana* are welcome, and should be sent to the Regional Director, Region 2 (address on page 2), by May 6, 1985.

Oxypolis canbyi

Oxypolis canbyi (Canby's dropwort) is a perennial plant found at a few locations in Maryland, Georgia, and the Carolinas, where it grows in swamps, shallow pineland ponds, and wet pine savannahs. This plant reaches up to 1.2 meters (47 inches) in height, has slender quill-like leaves, and gives off a slight fragrance of dill. The small flowers are white and green, sometimes tinged with red. In suitable habitat, *O. canbyi* has a strong colonizing habit and spreads vigorously by means of fleshy rhizomes.

The most significant threat to *O. canbyi* has been, and continues to be, the loss of wetland habitat on the lowland plain of the mid-Atlantic Coast. Several populations were lost as shallow ponds and wetlands were drained for conversion to lowland pastures, pine plantations, soybean fields, and other agricultural uses. Natural hydrological conditions also have been altered by suburban sprawl, road construction, and other forms of human encroachment, with resulting degradation of wetland habitat. Because of these threats, *O. canbyi* has been proposed for listing as Endangered (F.R. 3/29/85).

Seven populations of the plant are known to survive. A State-by-State summary of its status follows:

- Maryland—One population of approximately 36 stems is known from a site in the Chester River watershed in Queen Anne's County; however, it is within the area that would be af-

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ected by the proposed Upper Chester River Watershed Channelization Project. The Soil Conservation Service (SCS) has been advised of the species' presence in the project area, and of the Fish and Wildlife Service's intention to proceed with the listing process. Careful project planning and implementation may provide a means of conserving the site while meeting SCS objectives.

- Georgia—Populations of *O. canbyi* are present in Burke, Lee, and Sumter Counties, but several historical populations may be extirpated. The plant is officially considered by Georgia as an endangered species, a classification under State law that authorizes some protection.
- North Carolina—*O. canbyi* is recorded from one site in Scotland County, North Carolina. Its habitat is owned in part by The Nature Conservancy. Under a State law for the conservation of rare plants, North Carolina gives protection from intra-state trade in the species and has provisions for monitoring and proper management.
- South Carolina—Historically, *O. canbyi* is known from four sites in South Carolina, but only two still support the species. A vigorous population consisting of about 600 stems occurs on private land in

Bamberg County, and a second of approximately 500 stems exists in Colleton County. The Colleton site is now owned by The Nature Conservancy. Efforts are underway to protect the Bamberg site also, but both populations remain vulnerable to harm from certain roadside maintenance practices.

- Delaware—Although it once occurred in Sussex County, *O. canbyi* apparently is extirpated in Delaware. Its former habitat has been ditched and drained for agricultural purposes.

Most of the remaining population sites are vulnerable to habitat modification. If it is listed under the Endangered Species Act, however, *O. canbyi* and its habitat will receive protection from any adverse effects of Federal activities.

Comments on the proposal to list *Oxypolis canbyi* as an Endangered species are welcome, and should be sent to the Regional Director, Region 5 (address on page 2) by May 28, 1985.

* * *

Available Conservation Measures

If the proposals to list these eight plant taxa as Threatened or Endangered become final, they will receive the full protection authorized under the Endangered Species Act. Among the measures available for the conservation of listed plants are: restrictions on interstate/international trafficking of the plants and their parts or derivatives; protection from any adverse effects of Federal activities; a requirement

for the Service to develop recovery plans; and the possibility of Federal aid to States with endangered species cooperative agreements. (Hawaii, Georgia, South Carolina, and North Carolina are among the 16 States that currently have such agreements for Threatened and Endangered plants.)

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of Endangered or Threatened species. If an agency determines that a planned activity may affect a listed species or its habitat, it must consult with the Fish and Wildlife Service in order to find ways of avoiding jeopardy. Until a listing proposal is made final, however, agencies must only "consult" with the Service, a non-binding procedure. Except for the planned SCS project within the Maryland range of *Oxypolis canbyi*, no Federal actions that may affect the eight proposed plants are anticipated.

Although the protection given Threatened plants is the same in most respects as that given Endangered plants, the regulations governing trade in plants listed as Threatened are somewhat more flexible. Permits for trade in Threatened plants are available in a few more circumstances, although they still may be issued only for conservation-oriented purposes. Seeds from cultivated specimens of Threatened plants are exempt from trade controls if a statement of "cultivated origin" appears on their containers.

In any case, it is anticipated that few permits for the eight plants proposed for listing would be sought or issued any time soon because they are not common in cultivation or in the wild.

RECOVERY NEWS Two Butterflies

(continued from page 1)

The mission blue also exists on Twin Peaks in San Francisco and at Ft. Baker in Marin County. The reduced range of both butterflies and continued threats to the remaining colonies led the Fish and Wildlife Service to list the San Bruno elfin and mission blue butterflies as Endangered on June 1, 1976.

The San Bruno elfin is a brown butterfly with a wingspread of about one inch (26mm). Although the San Bruno elfin inhabits a region studied by entomologists for more than a century, it was not discovered until 1962. Perhaps its relatively subdued color, small size, and short adult flight period (very late February to mid-April) may be responsible for its late discovery. Even during peak adult flight periods, it can be easily overlooked.

Today, 14 colonies of the San Bruno elfin butterfly are known to exist, all restricted to the coastal mountains of north-

(continued on next page)



The male mission blue butterfly can be identified by its iridescent blue upper wings which are outlined in black and pale white.

Two Butterflies

(continued from page 8)

ern San Mateo County. All colonies are located in the fog belt on steep, north-facing slopes. Direct sunlight is minimal on these slopes, so moisture is conserved, and the butterfly's larval food plant, stonecrop, grows in abundance. Additional colonies may occur near Montara Mountain and Crystal Springs Reservoir, but the rugged terrain and inaccessibility of these areas have prevented a thorough search.

The mission blue butterfly, first described in 1937, also has a wingspan of about one inch (25 mm). Males of the species are iridescent blue on the upper wings with narrow black and pale white margins, and the lower wings are gray. The female's upper wings are primarily brown with some iridescent blue overlay, and its lower wings are grayish-brown. Both sexes are marked with an array of dark spots on their undersides. Mission blue butterflies can be observed from late March well into June. They are often seen perched on a lupine food plant or nectaring at coastal buckwheat flowers.

This butterfly was first collected on Twin Peaks in the Mission District of San Francisco. Only a small colony remains there today, and it is threatened by loss of habitat from residential development and trampling by tourists visiting Twin Peaks. Another colony exists at Ft. Baker in Marin County, but the largest populations occur on San Bruno Mountain, where the butterfly inhabits approximately 1,500 acres (about 615 hectares) of grassland. Here the butterfly has suffered loss of habitat from industrialization, urbanization, agricultural activities, quarrying, and encroachment of exotic plant species.

In addition to providing habitat for most of the remaining colonies of these two butterflies, San Bruno Mountain serves as a refuge for other species of animals and plants that are candidates for listing under the Endangered Species Act and for one species that has already been listed, the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). Although some of the fauna and flora can still be found at other localities, most have major populations on San Bruno Mountain.

Today, San Bruno Mountain is described as an island of habitat encompassed by a sea of urbanization, although human activities have substantially altered the natural vegetation and topography of the mountain. Habitat loss has already resulted from roadway, utility, home, industrial, and commercial construction, rock and sand quarrying, livestock grazing, and invasion of exotic species.

Both of the Endangered butterflies have suffered a great loss of habitat throughout their ranges, and minimum areas to sustain butterfly populations and their habitats are difficult to estimate. Today, the

San Bruno elfin inhabits only about 740 acres (300 ha) and the mission blue inhabits about 1,975 acres (800 ha). To ensure the continued existence of these butterflies, it is important to maintain the maximum area of undeveloped habitat for them.

Concerned local citizens have strived for years to preserve much of San Bruno Mountain in a near-natural state, but, due to its proximity to San Francisco, the mountain is very valuable real estate development property. In 1980, the San Bruno Mountain Steering Committee was formed to investigate issues surrounding the potential developments as they relate to rare plant and animal species on the mountain. This committee, composed of representatives from the Fish and Wildlife Service, the California Department of Fish and Game, the California Department of Forestry, the County of San Mateo, nearby city governments, and landowners and developers, was asked to develop a Habitat Conservation Plan (HCP) for the San Bruno Mountain area that would address the conflict between housing construction and Endangered species in a manner that would provide for the protection of the species. Implementation of the HCP is designed to allow private and public developments on the mountain to proceed without adversely affecting Endangered species, including the mission blue and San Bruno elfin butterflies.

Recovery Actions

The recovery plan for these two species addresses their recovery needs, discusses their life histories and requirements for survival, and describes characteristics of their remnant habitats. Its focus is to help maintain these species through conservation of their habitats. Because the two butterflies occur at other sites in the San Francisco Bay area, similar concerns of habitat protection, management, and rehabilitation also apply at these sites.

The primary objective of the recovery plan for the San Bruno elfin and mission blue butterflies is to maintain and enhance existing populations of these species throughout their ranges. Reclassification of the San Bruno elfin to Threatened can be considered when secure, self-sustaining colonies are established and/or reestablished. Numbers of colonies necessary for this butterfly's reclassification are seven on San Bruno Mountain, five on Montara Mountain, and two on Milagra Ridge. Reclassification of the mission blue to Threatened can be considered when secure, self-sustaining colonies of this species are established and/or reestablished on Twin Peaks and Ft. Baker (one colony at each site), and when existing colonies on San Bruno Mountain are made secure. Colony sizes and dynamics necessary for a population to be self-sustaining still need to be deter-

mined for both species.

Delisting of the species will be contingent upon protection, maintenance, and/or expansion of current colonies and establishment of additional ones. Population segments of these butterflies will probably remain small in size and distant from potential recolonization sources. Therefore, they will continue to be vulnerable to extirpation by natural catastrophe, disease, parasitism or pollution. These populations will need to be enhanced to maximize their chances for long-term survival.

Other objectives of the recovery plan are to rehabilitate ecosystems that have been altered by exotic plant introductions, ORV activity, and urbanization. Inadequate implementation of this plan, especially the habitat protection and management phases, will result in further loss and alteration of habitat, and increased threats to the survival of the two butterflies.

The recovery plan also identifies known essential requirements for the recovery and perpetuation of the San Bruno elfin and mission blue butterflies. It proposes a comprehensive array of short- and long-term activities to meet these objectives. The protection, management, and rehabilitation activities will benefit the two butterflies as well as numerous other wildlife and plant species not specifically mentioned in the plan, and will enhance public awareness of these conservation issues.

One of the first steps to help bring about the recovery of the butterflies is to secure essential habitat on and around San Bruno Mountain through cooperative agreements, easements, or other appropriate protective means. The San Bruno HCP provides security for much of the essential habitat for the butterflies on the mountain. In addition to this, further degradation of current habitat must be prevented by minimizing the use of herbicides, insecticides, and other toxic substances, by controlling ORV activity, and by removing exotic weeds. Protection of these areas is a high priority and is absolutely necessary to prevent further declines in distribution and abundance of the species.

In line with protecting the habitat, specific management plans for the existing colonies of San Bruno elfin and mission blue butterflies must be developed and implemented. To aid in developing these management plans, additional information on bionomics of the species must be obtained. Surveys and inventories on the butterflies and their food plants will be conducted, as well as studies on climatic and geologic factors, which are needed to more adequately understand the interactions of these species, their habitats, and their physical environments. The recovery plan also includes guidelines to help reestablish populations of the two butterflies in restored or rehabilitated habitat within their historical ranges.

Peregrine Falcon Restoration in the Southern Appalachians

by V. Gary Henry
Endangered Species Field Station
Asheville, North Carolina

In late 1982, the States of North Carolina, Tennessee, and Virginia were canvassed regarding their desire to participate in a program to restore the peregrine falcon (*Falco peregrinus*) in its historical range in the Southern Appalachians. The Fish and Wildlife Service's (FWS) Endangered Species Field Station in Asheville, North Carolina, had initiated activities earlier that year to prepare for releasing birds in North Carolina. These activities included: contacting ornithological societies, natural resource groups, and knowledgeable individuals for information on great horned owl (*Bubo virginianus*) distribution and historical peregrine use; field evaluation of historical and potential peregrine sites; and great horned owl surveys at potential release sites. (Great horned owl predation on young peregrines can have a serious impact on restoration efforts.)

A Southern Appalachian contingent, consisting of FWS, Tennessee Wildlife

Resources Agency (TWRA), and North Carolina Wildlife Resources Commission (NCWRC) personnel, was invited to the Eastern Peregrine Falcon Recovery Team meeting in fall 1983. Information on potential North Carolina and Tennessee release sites, including detailed information on the top priority site in North Carolina, was presented. At the time, the recovery team decided to delay extensive expansion to the Southern Appalachians until 1986 because of the continued need for available birds in the Northeast and Atlantic Coastal Regions. However, because of preparations already made in North Carolina and Tennessee, it was decided that initiation of hacking at one or two sites should begin in 1984 and continue in 1985.

The recovery team requested that I serve as coordinator for peregrine restoration efforts in the Southern Appalachians and develop a proposal for the region, in lieu of each State submitting individual proposals. The recovery team also recommended that personnel in the Southern Appalachians who will be involved in hacking peregrines should visit interior sites in New England to gain first-hand knowledge concerning site selection and hacking procedures.

Our first task was to develop guidelines and a form for evaluating potential Southern Appalachian sites. This was done with input from Dr. Don Hammer, Tennessee Valley Authority (TVA), and the late Mr. Art Renfro, U.S. Forest Service. Dr. Hammer had previously surveyed historical sites by air in 1980, accompanied by Peregrine Fund personnel. The guidelines and evaluation form were submitted to the recovery team and The Peregrine Fund for review, comments, necessary modifications, and concurrence. State wildlife agencies received these guidelines in April 1984 with a request for completion by December 31, 1985.

The Eastern Peregrine Falcon Recovery Plan had defined the Southern Appalachians Region to include western North Carolina and Virginia, eastern Tennessee, northern Georgia and South Carolina, and one site on the Virginia-Kentucky border. Included in the more recent guidelines was an expansion of the Southern Appalachians Region to include three sites in West Virginia, five additional sites in Virginia, one in Kentucky, and one in Alabama. In addition to North Carolina and Tennessee, some of the other States have also done several evaluations of potential and historical sites.

(continued on page 11)



Photo by Craig Kopple

immature female peregrine falcon

Peregrine Falcon

(continued from page 10)

Field evaluations of sites in North Carolina and Tennessee were conducted by The Peregrine Fund and the FWS in April 1984. Grandfather Mountain, North Carolina, was selected as the first site for hacking peregrines in the Southern Appalachians and additional evaluations of Tennessee sites were scheduled for May 1984. Evaluation, preparation, and hacking peregrines on this privately-owned site was a cooperative effort involving The Peregrine Fund; Grandfather Mountain, Inc.; the North Carolina Wildlife Resources Commission; the FWS; and the TVA. On May 21, 1984, four young peregrines arrived and were placed in a hack box. They were granted their freedom as fledglings on June 1 and remained in the vicinity until July 10, with no mortality. The effort was a complete success.

Further evaluation of Tennessee sites in the Great Smoky Mountains National Park by the FWS resulted in the selection of a site within the park boundaries for a late 1984 hacking project. Cooperators included The Peregrine Fund, the National Park Service, FWS, TVA, TWRA, and the Tennessee Ornithological Society. Four birds were received and placed in the hack box on July 31. The front of the cage was removed on August 10, and the birds remained in the vicinity until September 8. The effort at this site was also considered a complete success, although some concern has been expressed about the birds' somewhat early dispersal.

The Peregrine Fund experienced its best production year in 1984, with 124 birds produced. Each successful year results in the elimination of hacking sites from further use in the Northeast and Atlantic Coastal Regions due to the return of adult birds, therefore freeing up new birds for use on sites in the Southern Appalachians. Based on this trend, I requested that each State in the Southern Appalachians submit a minimum of one site by March 31, 1985, for possible use as hacking sites in 1985. (For North Carolina and Tennessee, this means one site each in addition to the sites used in 1984.) The sites are being prioritized and will be used as birds become available.

Recovery efforts in the Southern Appalachians for the peregrine falcon will continue, and will possibly be expanded in 1985, hopefully to as many as 50 birds or more a year beginning in 1986. This, however, will depend not only upon production at The Peregrine Fund and return of adult birds to hack sites, but also upon funding to State agencies through Section 6 of the Endangered Species Act.

REGIONAL BRIEFS

(continued from page 3)

The Yazoo darter, *Etheostoma* sp., is a small undescribed species occurring in the Little Tallahatchie and Yocona River systems of northern Mississippi. Known collections of this darter indicated that it was restricted to four or five sites, and was not very abundant at any of these sites. The FWS contracted with Dr. Ken Thompson (University of Mississippi) and Dr. Jess Muncy (FWS Cooperative Research Unit, Mississippi State University) in September 1983 to survey the status of this fish. Their final report, delivered in January 1985, documents abundant darter populations in 16 different tributaries of the two river systems. Two of the sites are on federally-owned property and one is owned by the University of Mississippi. Based on the widespread distribution and lack of an identifiable threat, the Yazoo darter does not appear to warrant a proposal for listing under the Endangered Species Act at this time. Should a significant and identifiable threat materialize, the FWS will reevaluate this determination.

Region 5—Representatives from 17 eastern States participated in a 2-day workshop in Airlie, Virginia, to coordinate activities for an inter-regional project to determine the rangewide status of 32 candidate plants. Botanists from the FWS, The Nature Conservancy, State natural resource agencies, and private organizations met to exchange information on the species prior to initiation of the 1985 field work. This is the first year of what Region 5 personnel believe will become a multi-year project between the FWS and The Nature Conservancy.

Region 6—The Greenback Cutthroat Trout Recovery Team recently received the "Researcher of the Year" award from the Colorado Chapter of the National Wildlife Federation. This award was given in recognition of the efforts that the recovery team and its supporters have achieved toward recovery of the greenback cutthroat trout (*Salmo clarkii stomias*). When the Endangered Species Act was enacted in 1973, there were fewer than 3,000 of these trout occupying only three sites. Recovery efforts through 1984 have resulted in 16 sites with greenbacks in 35 miles of stream habitat and 46 surface-acres of flatwater. If recovery efforts continue at their present rate, there is hope for future delisting of the species.

Region 7—During the 19th and early 20th centuries, fur traders introduced Arctic foxes (*Alopex lagopus*) to many islands of the Aleutian Chain—lands previously free of mammalian predators. The

effect on native avifauna was devastating. The now Endangered Aleutian Canada goose (*Branta canadensis leucopareia*), which once nested throughout the Aleutian Islands, was extirpated from all islands onto which foxes were introduced. Remnant goose populations survived on two small islands that remained fox-free.

The FWS proposes to restore Aleutian Canada geese to the Aleutians and provide for the recovery of other bird populations by removing foxes from as many as 32 islands. Because of the large land areas involved and the remoteness of the islands, dispersal of toxic baits is the most cost-effective and possibly the only feasible means of removing foxes. Compound 1080 was chosen as the preferred toxicant because of its high toxicity to foxes and relatively low toxicity to birds, the only non-target species likely to be affected. Other alternatives that were considered, including mechanical removal (i.e., shooting or trapping), biological control, and the use of sterilants, are neither economically nor technologically feasible.

As a precursor to any large-scale fox removal effort, the Region 7 Endangered Species Office, in conjunction with the Alaska Maritime NWR, proposes to implement, under authority of an EPA permit, an experimental fox removal program on 69,500-acre Kiska Island. This experimental program is planned as a 3-year study to assess the effectiveness of Compound 1080 and to document resultant changes in populations of native species. Findings will be used to seek EPA registration of Compound 1080 for Arctic fox removal from the Aleutians and aid in designing future fox removal efforts.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works *only* for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service *will not* deliver it.

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To make this *your* BULLETIN, as well as ours, we need your help. Please send the Editor any comments for improving the format, ideas for articles, photographs, and reports on current research and management activities.

Recovery Plan Update

The following recovery plans were recently approved: *Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan* (11/16/84); *Paiute Cut-throat Trout Recovery Plan* (1/25/85); *New Mexican Ridge-nosed Rattlesnake Recovery Plan* (3/22/85); *Todsen's Pennyroyal Recovery Plan* (3/22/85); *Bald Eagle-Pacific States Recovery Plan* (3/28/85); *MacFarlane's Four-O'Clock Recovery Plan* (3/28/85); *Kuenzler's Hedgehog Cactus Recovery Plan* (3/28/85); *Texas Poppy-mallow Recovery Plan* (3/29/85); and *Knowlton Hedgehog Cactus Recovery Plan* (3/29/85).

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	20	19	234	4	0	22	299	22
Birds	59	13	144	3	1	0	220	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	30	4	11	17	3	0	65	37
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	4	0	0	12	9
Plants	67	5	1	11	2	2	88	40
TOTAL	225	47	461	56	10	37	836	210**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 177

Number of species currently proposed for listing: 28 animals
42 plants

Number of Species with Critical Habitats determined: 69

Number of Cooperative Agreements signed with States: 42 fish & wildlife
16 plants

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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Four Plants Given Endangered Species Act Protection

During April 1985, the following four plants were listed by the Fish and Wildlife Service for protection under the Endangered Species Act:

Goetzea elegans

Goetzea elegans (the beautiful goetzea), a very rare evergreen shrub or small tree that is found only in northern Puerto Rico, has been listed by the Service as Endangered (F.R. 4/19/85). Road construction, periodic trimming of roadside vegetation, certain livestock grazing practices, and potential limestone mining threaten this species' survival.

Fewer than 50 beautiful goetzea plants currently are known to exist. Two of the three known sites where the species occurs are separated by about one-quarter mile (0.4 kilometers) and are found along the edge of a semi-evergreen seasonal forest on limestone in the Guajataca Gorge area of Isabella, Puerto Rico. One of these two sites is privately owned and harbors only six plants; the other is owned by the Commonwealth of Puerto Rico's Department of Transportation and Public Works, and supports only one or two adult plants and three root suckers. The third site, a privately-owned remnant of undisturbed forest, is located about 3.5 miles (5.6 km) east of the other two sites on a ravine in the Municipality of Quebradillas. Approximately 30 individuals of the beautiful goetzea can be found here, including the only plant known to have produced flowers and fruit since 1936.

On June 18, 1984, the Service proposed to list *G. elegans* as an Endangered species (see BULLETIN Vol. IX No. 1). Only two comments were received; see the final rule in the April 19, 1985, *Federal Register* for details.

Critical Habitat was not designated for *G. elegans* as part of the final rule, due mostly to the possible threats to its existence from collecting, taking, or vandalism. The required publication of maps that are part of a Critical Habitat designation could increase the beautiful goetzea's vulnerability and be detrimental to its survival. However, even without this formal designation, the species and its habitat will still receive all the protection author-

ized by Section 7 of the Endangered Species Act.

The only potential Federal involvement known at this time that may have an effect on the beautiful goetzea is that of the Federal Highway Administration (FHWA). In the event that highways adjacent to the species' sites are widened or resurfaced as they have been in the past, FHWA may be required under Section 7 to consult with the Fish and Wildlife Service to avoid jeopardizing the species' survival. A strong commitment will be needed to protect *G. Elegans*' habitat from substantial modification and, ultimately, the extinction of the species.

Amsinckia grandiflora

As a result of habitat modification for agricultural use, intensive livestock grazing, urban development, and other land use activities that have extensively altered the natural plant communities within its historic range, *Amsinckia grandiflora* (large-flowered fiddleneck) populations have drastically declined over the years.

Currently, fewer than 50 individuals are known to exist. These low numbers, along with an extremely restricted range and low reproductive potential, contribute to the species' vulnerability. To reduce the possibility of its becoming extinct, the Service has published a final rule listing *Amsinckia grandiflora* as Endangered and designating its Critical Habitat (F.R. 5/8/85).

The large-flowered fiddleneck has bright green foliage covered with coarse, stiff hairs and red-orange flowers arranged in a fiddleneck-shaped inflorescence, as the species' common name describes. Today, this annual plant is known to survive only at a half-acre (.2 hectare) site on Department of Energy (DOE) land near Livermore, California, in southwestern San Joaquin County. The site is a grassy, steep, west- and south-facing slope of a small ravine having light-textured clay soil. Invasion of its habitats by other, more aggressive *Amsinckia* species and weedy exotic plants are threatening the large-flowered fiddleneck. In addition, testing of explosives by DOE, although not conducted in the immediate vicinity of the population, has the potential

to start grass fires that could enter the species' habitat and affect its chances for survival. After these threats were recognized, the Service proposed listing the species as Endangered (see story in BULLETIN Vol. IX No. 6).

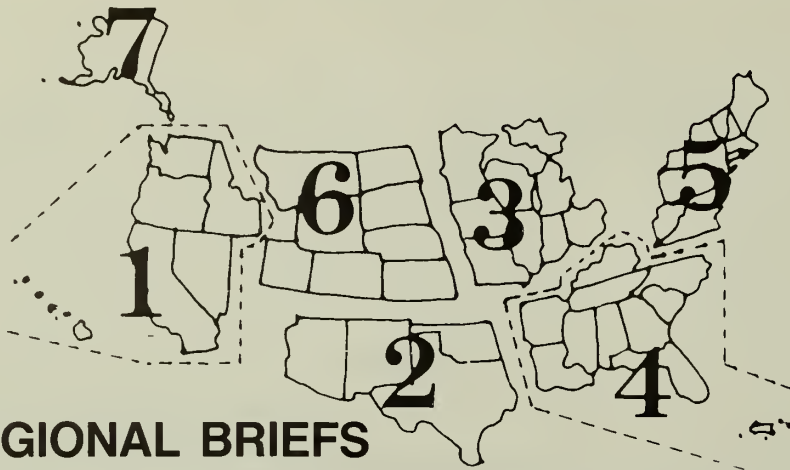
Critical Habitat has been designated for *Amsinckia grandiflora* to include one area of approximately 160 acres (65 hectares) in San Joaquin County. This area exceeds the current range of the fiddleneck, but it is believed to contain places suitable for expansion or relocation of the species that are needed for the plant's recovery. With a steep west- and south-facing slope and light-textured soil, the Critical Habitat area satisfies the most immediate physiological needs of *A. grandiflora*. Conserving this area would meet most of its requirements on a long-term basis.

The University of California's Lawrence Livermore Laboratory has been given funding and authorization by DOE to conduct various activities in the vicinity of the large-flowered fiddleneck population and its Critical Habitat. These activities, which include testing of chemical high explosives, controlled burning, and construction, could adversely impact the fiddleneck and its habitat unless they are undertaken carefully. Consultation between the Service and DOE will be necessary to ensure that such activities have no adverse effects.

Carex specuicola

A perennial member of the sedge family, *Carex specuicola* has a triangular stem 25-40 centimeters (10-16 inches) high and thin, pale green leaves clustered near the base. This species is found only around three seep-springs near Inscription House Ruin on the Navajo Indian Reservation, Coconino County, Arizona. Each population occurs on an area of less than 200 square meters (2,150 square feet) along the outflow from its respective seep-spring. It is estimated that all three populations total fewer than 700 plants. The species was proposed for listing as Threatened with Critical Habitat on April 11, 1984 (see story and drawing in BULLETIN Vol. IX No. 5).

(continued on page 10)



REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of April:

Region 1—The cui-ui (*Chasmistes cujus*) migration season is at hand. The Marble Bluff Fish Facility is operational and the Great Basin Complex field crew is

monitoring the build-up of the offshore, prespawning aggregate. Cui-ui spawners should begin entering the Truckee River by early May. Over 150 adult cui-ui have already been captured in the river delta with a merlin trap. These fish were marked and released for estimating the

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size of the aggregate. In addition to these adults, over 100 precocious cui-ui from the 1980 year class were caught and released along with 200 adult Lahontan cut-throat trout (*Salmo clarki henshawi*), all fish ranging in size from 5-13 pounds.

Region 2—The revised Whooping Crane Recovery Plan is currently being prepared for agency review, and a contingency plan is being reviewed by Fish and Wildlife Service (FWS) and State personnel. The contingency plan describes response actions for use whenever a sick or injured whooping crane (*Grus americana*) is sighted or when healthy whoopers are sighted in a hazardous situation (e.g., disease outbreak, high-risk hunting situation, environmental contaminants).

The Bosque del Apache National Wildlife Refuge (NWR) flock is on its summer grounds in Idaho and Wyoming. All but one of the Aransas NWR whoopers had departed for Wood Buffalo National Park in Canada by April 24. No mortalities have been reported during migration this spring.

The annual Kemp's ridley sea turtle (*Lepidochelys kempi*) project at Rancho Nuevo, Mexico, is currently under way. On April 11, the American contingent joined its Mexican counterpart at the beach to set up camp. Fifteen turtles arrived on the beach to nest on April 15, followed by 25 more on April 20. These numbers are typical of the slow nesting start for this species. The Secretaria de Pesca (Mexico's Secretary of Fisheries) generously donated to the U.S. 3,000 Kemp's ridley eggs, as compared to previous donations of 2,000 eggs. These eggs will be used to augment the imprinting program conducted by the National Park Service at Padre Island National Seashore and the headstart program at Galveston National Laboratory (National Marine Fisheries Service) in Texas. The increase in donated eggs reflects a major increase in commitment to the project by agencies in Mexico and the United States.

A recent helicopter survey located a new bald eagle (*Haliaeetus leucocephalus*) nest in a cottonwood tree in west-central Arizona along the Bill Williams River drainage on Bureau of Land Management (BLM) land. At the time of discovery, the grove of trees in which the nest was found was on fire. Survey personnel and BLM firefighters were able to save the tree and the nest, which contained two chicks that were about 8 or 9 weeks old. The adult female bald eagle was found carrying a radio backpack, indicating that she was fledged from the Southwest bald eagle population along the Salt and Verde Rivers (Arizona) in the late 1970s. Currently, there are 15

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Two Plants Proposed for Listing as Endangered

Two rare species of plants were proposed by the Fish and Wildlife Service recently for listing as Endangered. One is a wildflower endemic to Minnesota, and the other is a shrub native to one of the Hawaiian Islands. If, after further consideration, these listing proposals are made final, both plants will receive protection under the Endangered Species Act.

Minnesota Trout Lily

The only known species of plant that is found only in the State of Minnesota, the Minnesota trout lily (*Erythronium propullans*), appears to be in danger of extinction. Only 14 sites are known, all 1–3 acres (.4 to 1.2 hectares) in size with a total of a few hundred plants in Rice and Goodhue Counties. These colonies are vulnerable to habitat loss resulting from construction of housing projects and other forms of urban development.

The lily-like plant is about 15 centimeters (6 inches) tall, with one pair of mottled green, pointed leaves arising from near the base. A single small, nodding, bell-shaped flower is borne at the end of a slender, leafless stalk. Its recurved petals are pink or roseate. A spring ephemeral, it blooms in April or May, and then the aerial parts of the plant disintegrate after the canopy of its deciduous forest habitat fills out in early June.

E. propullans grows on the north-facing slopes of wooded valleys along the Cannon and Zumbro Rivers. All occur on privately owned land. Several large historical colonies located 1.5 miles (2.4 kilometers) from the city of Faribault have been eliminated by conversion of pastureland to cropland. Road construction near Faribault also has eliminated several colonies, and another within the city limits has been destroyed by motorcycle use. Most of the remaining urban sites face these same threats. Fortunately, two Minnesota trout lily sites are owned by the Minnesota Chapter of The Nature Conservancy and are being managed for the species' benefit.

The proposal to list *E. propullans* as Endangered was published in the *Federal Register* on May 3, 1985. A designation of Critical Habitat was not included since publicizing the sites with maps and detailed habitat descriptions would increase the vulnerability of this rare wildflower to overcollection. One of the sites was severely damaged in the early 1970s when a large number of plants were removed for replanting in a landscape arboretum.

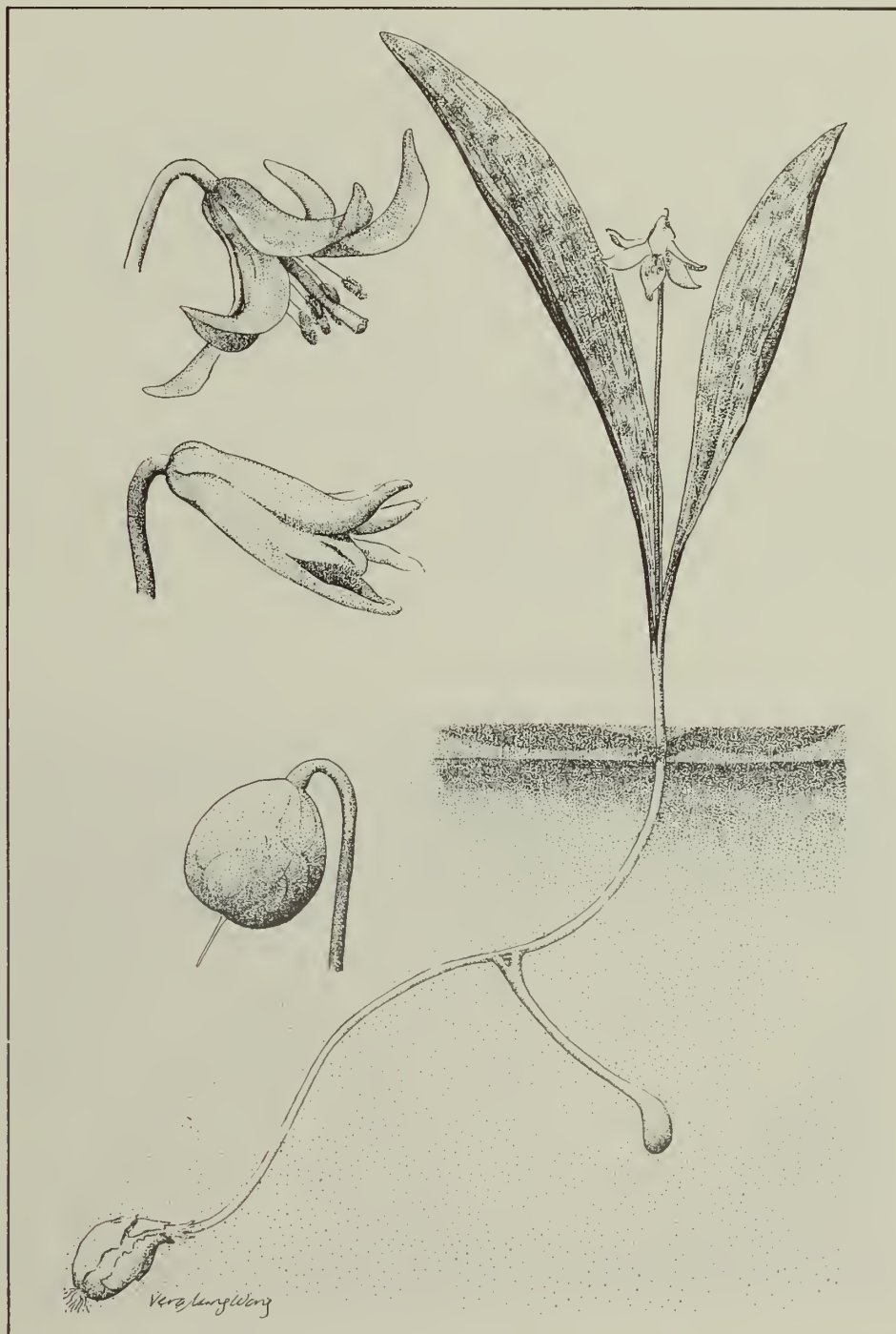
Comments on the listing proposal are welcome from all interested agencies, organizations, and individuals, and are due to the Endangered Species Division, Region 3 (see page 2 of the BULLETIN for address) by July 2, 1985.

Achyranthes rotundata

As has happened to so many of the plant species endemic to the Hawaiian Islands, *Achyranthes rotundata* has declined drastically from habitat loss and competition from exotic plants. This low shrub reaches up to 6.5 feet (2 meters) in height and is covered with short, silvery hairs. Although the flowers themselves are small and inconspicuous, the inflorescences and leaves are valued in making traditional leis.

Historically, *A. rotundata* may have been abundant all along the arid and semi-arid lowlands of the Wai'anae Coast on the island of O'ahu. After an apparent 88-percent reduction in range, *A. rotundata* can be found today only at opposite ends of the coast. One population, which occurs on a military reserve at Ka'ena Point, consists of only two individuals. Approximately 2,000 plants are known from the Barbers Point population, at the opposite end of the species' historical range.

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Minnesota trout lily, with flowers and capsule

Drawing by Vera Wong

Two Plants

(continued from page 3)

A. rotundata appears to be in danger over the remaining 12 percent of its historical habitat, a remnant that itself has already been altered to an extent. The two plants at Ka'ena Point could be overwhelmed by thickets of exotic plants. At Barbers Point, the population consists of three distinct sub-populations. One of them contains 80 percent of the species' known total numbers and occurs on privately owned lands that are proposed for development as an industrial site. The remaining two small colonies are on Federal lands managed by the U.S. Army and Coast Guard. A variety of introduced plants at Barbers Point threaten to crowd out *A. rotundata* and alter the open, sunny habitat it needs. Because of the decline and continuing threats to its survival, *Achyranthes rotundata* was proposed for listing as an Endangered species (F.R. 4/22/85).

Research now in progress indicates that two additional species of *Achyranthes*, now believed to be extinct, may in fact be synonymous with *A. rotundata*. Should this prove true, the

species would have originally been found on Lana'i and Moloka'i, as well as on O'ahu, emphasizing the historical decline in range.

A designation of Critical Habitat was not included in the proposed listing rule because publicizing the population sites could subject them to greater taking pressure. As already mentioned, the plant has been used for making leis. Due to its rare status, *A. rotundata* also could be sought after by collectors of rare plants or by vandals.

Comments on this proposal are invited and are due to the Regional Director, Region 1 (address on page 2), by June 21, 1985.

Available Conservation Measures

If the proposals to list *Erythronium propullans* and *Achyranthes rotundata* as Endangered are made final, both plants will receive protection under the Endangered Species Act. One of the conservation measures authorized by the Act is a prohibition against interstate or international trafficking in Endangered plant species without a permit. Another, which makes it illegal to remove and reduce to possession Endangered plants from lands

under Federal jurisdiction, would apply to the *A. rotundata* plants on Federal land. (Further, under Hawaii's own endangered species legislation, a Federal listing would automatically put the species on the State's list, and take would be prohibited under State law.) There is the possibility, through Section 6 of the Act, of Federal funding to States that have Endangered Species Cooperative Agreements with the Fish and Wildlife Service. (Currently, Hawaii is among the States with such an agreement for plants.)

Under Section 7, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of Endangered species, even when Critical Habitat has not been designated. Of the two plants proposed for listing in April, this provision would probably apply mainly to *A. rotundata*, since it occurs on Federal lands at the Ka'ena Military Reserve, Camp Malakole, and the Barbers Point Lighthouse grounds. Plans are being considered to declare these lands, in whole or in part, as excess and thus eligible for disposal. Cooperation among the Fish and Wildlife Service and the appropriate Federal agencies will be needed to conserve the species' remaining habitat.

Recovery Plan for Smith's Blue Butterfly

On November 9, 1984, the Fish and Wildlife Service approved a recovery plan to assist in the recovery of the Endangered Smith's blue butterfly. This plan, when funded and carried out, may help restore this species to a more secure status.

The Smith's blue butterfly (*Euphilotes enoptes smithi*) is a relatively small but-

terfly with a wingspan of slightly less than one inch. Males are bright lustrous blue on the upper wing surfaces, and females are brown with a band of red-orange markings across the hind wings. The undersides of both males and females are whitish-gray and speckled with black dots. Both sexes also have prominently checkered fringes on both fore wings and hind wings, but males have wide black borders

and a very hairy appearance of the body. The Smith's blue butterfly is separated from other subspecies of *E. enoptes* by its light undersurface ground color with prominent overlying black markings.

This butterfly is endemic to a number of inland and coastal sand dunes, serpentine grasslands, and cliffside chaparral communities along the central California coast in Monterey, Santa Cruz, and San Mateo Counties. When the species was listed as Endangered on June 1, 1976, it was known primarily from remnant, partially stabilized sand dunes around Monterey Bay. Since its listing, additional colonies of the butterfly have been discovered in other locations and habitat types, including the ancient beach sands at Zayante Sand Hills and a serpentine grassland in San Mateo County.

The Smith's blue and other members of the genus *Euphilotes* are intimately dependent on their host plants, seacliff buckwheat and coastal buckwheat. The buckwheats are used as larval and adult food plants—the larvae eat the flowerheads and the adults obtain nectar from the flowers. Adult butterflies of both sexes use the same plants not only as their primary nectar source, but also as sites for resting, sunning, mate location, and copulation. The primary factor that limits the populations of the Smith's blue is the occurrence of its host plants; however, presence of these host plants does not always indicate that the butterfly will

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Photo by Larry Orsak

The Endangered Smith's blue butterfly faces threats primarily from recreational activities.

Butterfly

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be present in an area since the plants are much more widely distributed than the butterfly.

Adult butterflies are univoltine (a single generation per year) and emerge from their pupal cases in a single extended flight season from mid-June to early September, a period synchronized with the peak flowering period of the buckwheats. Individual adults live for only about one week; however, individual emergences are staggered over the long summer flight period. This long flight period is partially the result of microclimatic differences among the habitats and differences in the flowering time of the host plants, which themselves can be significantly affected by annual climatic variation.

The Seaside-Marina dune complex contains patches of suitable habitat for the Smith's blue. Even though this dune system has been drastically altered in recent times, it is still one of the largest and best preserved dune systems in central California. This dune complex has been severely affected by housing developments, highway construction, off-road vehicle (ORV) use, foot traffic, urbanization, sand mining, military activities, and the introduction of exotic plants. More than 50 percent of the dunes have been destroyed or significantly altered.

The long-term survival of the Smith's blue butterfly colonies in coastal dune habitats depends on continuous recruitment of the native plants produced by dynamic sand dune succession. This natural successional sequence has been altered in many of the dunes in the Seaside-Marina system by the introduction of Holland dune grass (*Ammophila arenaria*) and iceplant (*Carpobrotus* ssp.) for sand dune stabilization. These two plants disrupt the natural successional process and tend to out-compete many of the native plants in this system.

Recreational activities are also often destructive to sand dune vegetation. The use of dunes by hikers and hang-gliders is destructive to sand dune vegetation, disturbing both plants and seeds. The construction of parking lots for dune users also destroys habitat by covering the dunes with pavement and by increasing the foot traffic in nearby areas. Another major threat to the butterfly colonies in coastal dune habitats is ORV traffic. The destructive effects of this activity are well-documented at Marina State Beach and on dune systems throughout the west coast. Urbanization has also played a major role in reducing habitat quality in coastal sand dunes.

Other causes of the decline of Smith's blue habitat include the military activities at Fort Ord in Monterey County, although Fort Ord does maintain a preserve for the butterfly. Sand mining also is a significant

contributor to the direct destruction of this species' habitat. In 1983, Smith's blue butterflies were discovered at two locations in Santa Cruz County. One of these inland dune habitats is an active quarry. The amount of natural dune habitat remaining at this site has been reduced by sand mining operations, and the size and extent of distribution of the butterfly colony there is not known. The other known inland dune habitat has experienced some surface disturbance, but a much greater proportion of the native vegetation is still intact.

Smith's blue butterfly colonies are also found in sites not associated with sand dunes. They are found on steep coastal cliffs in the Big Sur region, in woodlands somewhat inland at Vasquez Knob, and in road cuts along Cove Peak Road. Many of these sites appear relatively secure because they are inaccessible and unsuitable for human development. However, in unseasonably wet years such as 1982, some of these sites experienced slope failure and slumping. Road maintenance and rebuilding threatens the integrity of some of these habitats.

These butterflies have also been collected from near Crystal Springs Reservoir in San Mateo County. The habitat type there is referred to as serpentine grassland and is located on water company lands within the San Francisco Bay watershed. There are no known threats to the butterflies at Crystal Springs Reservoir; however, most of the other serpentine grasslands in the San Francisco Bay area have been developed or are vulnerable to development. If any other butterfly colonies are discovered in these other serpentine grasslands, they will more than likely be vulnerable, too.

Recovery Actions

The primary objective of the recovery plan for the Smith's blue butterfly is to prevent extinction of the species and to accomplish its recovery by conserving the ecosystems upon which it depends for survival. This objective will be achieved when either of the following conditions have been met: (1) when colonies at all the 18 known sites have viable, self-sustaining populations that have been maintained for a period of 10 consecutive years with no foreseeable threats to the future survival of the colonies, or (2) when an equivalent number of butterfly colonies have been made secure at comparable alternative sites that will ensure the species survival. If, after 10 consecutive years, a total of 18 sites appear to be permanently protected, then the Smith's blue butterfly would qualify for delisting.

To accomplish the plan's primary objective, it is important that appropriate Federal and State agencies vigorously enforce all laws and regulations that may affect the survival of the species. These laws include, the Endangered Species

Act, the California Coastal Zone Protection Act, the Federal Coastal Zone Management Act, the National Environmental Policy Act, and the California Environmental Quality Act. Effective law enforcement is needed to reduce unauthorized ORV traffic on coastal sand dunes and inland dune parklands, and is also needed for activities that result in the taking of this butterfly. Such activities include sand mining, grading, and various development projects in the coastal and inland sand dunes.

The populations at Marina State Beach are extremely vulnerable, so a management plan for this area must be developed and implemented. As previously stated, recreation in the form of unrestricted foot traffic, hang-gliding, and occasional ORV traffic on the dunes threaten the survival of the colonies here by destroying dune vegetation and causing substrate compaction. A management plan is needed to give direction to the State Park staff for managing these habitats. Reserves should also be set up to protect the two large colonies at the beach. The reserves should include the areas where the colonies now occur and include reasonable buffer strips.

The active blow-out at Marina State Beach threatens to move across Highway 1. If this occurs, sand would be removed to maintain the road and that sand would be lost to the dune system. Stabilizing this blow-out is a high priority recovery task. Native plants should be used to stabilize the sand and increase host plant availability. Iceplant and Holland dune grass, widely used in California to stabilize sand dunes and highway rights-of-way, tend to exclude native flora. Replacing them with native dune species would provide additional habitat for the Smith's blue and help to secure the colonies at Marina State Beach.

The Salinas River National Wildlife Refuge is cooperatively managed by the Service and the California Department of Fish and Game. Some colonies of Smith's blue butterflies occur in remnant sand dunes on the refuge. However, exotic plants have invaded the dunes and ORV use has degraded the area. The same control measures need to be taken for the butterfly here as at Marina State Beach.

The U.S. Army has designated one of the sand dune areas at Fort Ord as a preserve for the Smith's blue butterfly. Patrols are needed at both the north and south dune areas to control ORV use. Iceplant is also a problem here despite recent attempts by the Youth Conservation Corps to remove this exotic plant. The effort should be continued and a management plan should be prepared for the butterfly preserve to give direction and continuity to military activities in adjacent areas.

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Butterfly

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For the Smith's blue colony in the Zayante Sand Hills, a land protection plan should be developed to identify an effective means for protecting this colony which inhabits areas held in reserve for future sand mining activities. Unless

these areas that support the butterfly are protected, the species will lose its valuable habitat here. Habitat management plans also are needed for the colonies that occur in the several cliffside chaparral communities and serpentine grasslands (Crystal Spring Reservoir, Big Creek Preserve, Burns Creek, Vasquez Knob, and Cove Peak Road).

All additional sites where Smith's blue colonies are found may be more difficult to manage and secure because many of them are privately owned and some have already been proposed for development. Nevertheless, the Service will explore possible ways to maintain and protect these habitats.

Progress in the Robbins' Cinquefoil (*Potentilla robbinsiana*) Recovery Program

by Dr. Kenneth D. Kimball
Director, Research Department
Appalachian Mountain Club

The Robbins' or dwarf cinquefoil (*Potentilla robbinsiana* Oakes) is a small perennial flower endemic to the alpine zone of the White Mountain National Forest, New Hampshire. It was listed as Endangered under the Endangered Species Act on September 17, 1980 (see story in BULLETIN Vol. V No. 10). *P. robbinsiana*, a member of the rose family, is a very low, almost stemless plant. Mature plants are no larger than a half-dollar, with a dense tuft of leaves above ground and deep tap root underneath. During mid-June, *P. robbinsiana* supports one to thirty slender flowering stems, each bearing a single, complete yellow flower. The species is associated with an open, exposed alpine habitat, where competition from other plants is low.

Historically, the plant was known to occur in three or four sites, but, after the 1960s, it was known to survive at only a single location, the Monroe Flats on Mt. Washington, at about 1,550 meters (5,086 feet) in elevation. This population is comprised of approximately 1,600 mature plants occupying an area less than one hectare (2.5 acres) in size. The Monroe Flats population is adjacent to the heavily hiked Crawford Path, part of the Appalachian Trail, and is within 300 meters (328 yards) of the Appalachian Mountain Club's (AMC) Lakes of the Clouds (LOC) Hut, which can host 90 overnight guests. In 1984, another adult and one deceased plant, surrounded by several juvenile plants, were found in the White Mountains at the site of a population once thought to be extirpated.

Because *P. robbinsiana*'s survivability is contingent on the conservation of the Monroe Flats population, protection and recovery efforts for the species are closely coordinated among the AMC's Research Department, the Fish and Wildlife Service's Region 5 Endangered Species Office, and the U.S. Forest Service. The primary objectives of the Robbins' Cinquefoil Recovery Plan (approved July 22, 1983) are to protect this population in its entirety, encourage its natural

expansion, and establish four new self-sustaining populations within the species' presumed historical range.

Due to its reduced numbers, *P. robbinsiana* is threatened by potential drought from two natural environmental stresses, wind desiccation and frost-heaving. Trampling by hikers, however, may be the most serious threat. In 1979, efforts to protect *P. robbinsiana*'s habitat from hikers began with the construction of a screen wall to clearly define the route of the hiking path and discourage off-trail excursions by hikers into the species' essential habitat. Since 1981, the AMC Research Department has been monitoring causes of trespass into the habitat. In addition, the AMC has been conducting programs at the LOC hut to educate hikers and botanists on their roles in the species' conservation. The Crawford Path was diverted out of the plant's habitat, and the essential habitat was legally closed to public use in 1983. Several *P. robbinsiana* have been transplanted into a viewing garden adjacent to the LOC hut for observation and education. These ongoing efforts have greatly reduced the potential stress to the population from trampling.

In 1973, and again in 1983, the population was counted by Dr. Raymond Graber of the U.S. Forest Service. A slight decline was observed, which may represent natural annual variations in population size. Funded through the Fish and Wildlife Service, the AMC Research Department (under my direction) began research on the species' demography, habitat requirements, and reproductive biology in 1984. Drs. Tom Lee (of the University of New Hampshire) and Charlie Cogbill (of the Center for Northern Studies) have been working with the AMC study. The objective of the continuing project is to assess the potential genetic variability within the parent population prior to the selection of seed stock to be used in establishing new populations. Though the flower has both male and female reproductive organs, ongoing studies suggest that *P. robbinsiana* produces seed through apomixis, i.e. reproduction without fertilization. Pollination does appear to be necessary, however, as a catalyst for embryo formation.

In his review of the historical data on the *P. robbinsiana* population and the stability of its current habitat, Dr. Cogbill

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Potentilla robbinsiana occupies protected niches between small stones in the exposed alpine habitat of the Monroe Flats on Mt. Washington, New Hampshire.

Photo by Rose Paul

Status Review on Ivory-billed Woodpecker

The Service has initiated a status review on the ivory-billed woodpecker (*Campephilus principalis*) to determine if this species is extinct and should be removed from the U.S. List of Endangered and Threatened Wildlife (F.R. 4/10/85).

The ivory-billed woodpecker is the largest North American woodpecker, averaging 20 inches (51 centimeters) in length. Its plumage is shiny black, with a white stripe down the neck from the cheek to the back. The outer halves of the secondaries (inner major flight feathers) are white and form a large triangular patch across the lower back when the bird is perched. Females have a black crest; males have a red crest. Its large bill is the distinctive color of pale ivory.

The ivory-bill is often confused with the smaller pileated woodpecker (*Dryocopus pileatus*), which is about 17 inches (43 cm) long. Pileated woodpeckers, however, show no white across their backs when resting. In flight, pileated woodpeckers show white on the forward rather than the rear portion of the wing (as in the ivory-bill). Both male and female pileated woodpeckers have a red crest (the male's is more extensive) and a black bill.

Two subspecies of the ivory-bill are recognized by the American Ornithologists' Union: the American ivory-billed woodpecker (*Campephilus principalis principalis*) and the Cuban ivory-billed woodpecker (*Campephilus principalis bairdii*). Both subspecies may be extinct and are being considered under this notice of status review. Differences between the two subspecies are minute and can only be seen in the hand. The Cuban subspecies was last reported from the pine forests of the eastern mountains of Cuba, but was known to occur historically over most of Cuba, including the Isle of Pines.

The American ivory-billed woodpecker formerly occupied bottomland and swamp forests from northeastern Texas, southeastern Oklahoma, northeastern Arkansas, southeastern Illinois, southern Indiana, and southeastern North Carolina; southward to southern Florida; and west through the Gulf States to the Brazos River, Texas. Early accounts gave no accurate or definite statements of abundance, but indicated that the ivory-bill was never common. Its numbers and distribution began to decrease in the latter half of the nineteenth century.

The primary reason for the decrease in ivory-bill numbers appears to be a reduction in suitable habitat from logging of old-growth cypress swamps and bottomland forests. Young trees apparently provide much fewer of the food insects (wood-boring larvae) that the ivory-bill needs

than do the mature trees of a very old or virgin forest. Large stands of such trees are necessary; the home range of a pair of ivory-bills is estimated at 6 to 17 square miles (15 to 44 square kilometers).

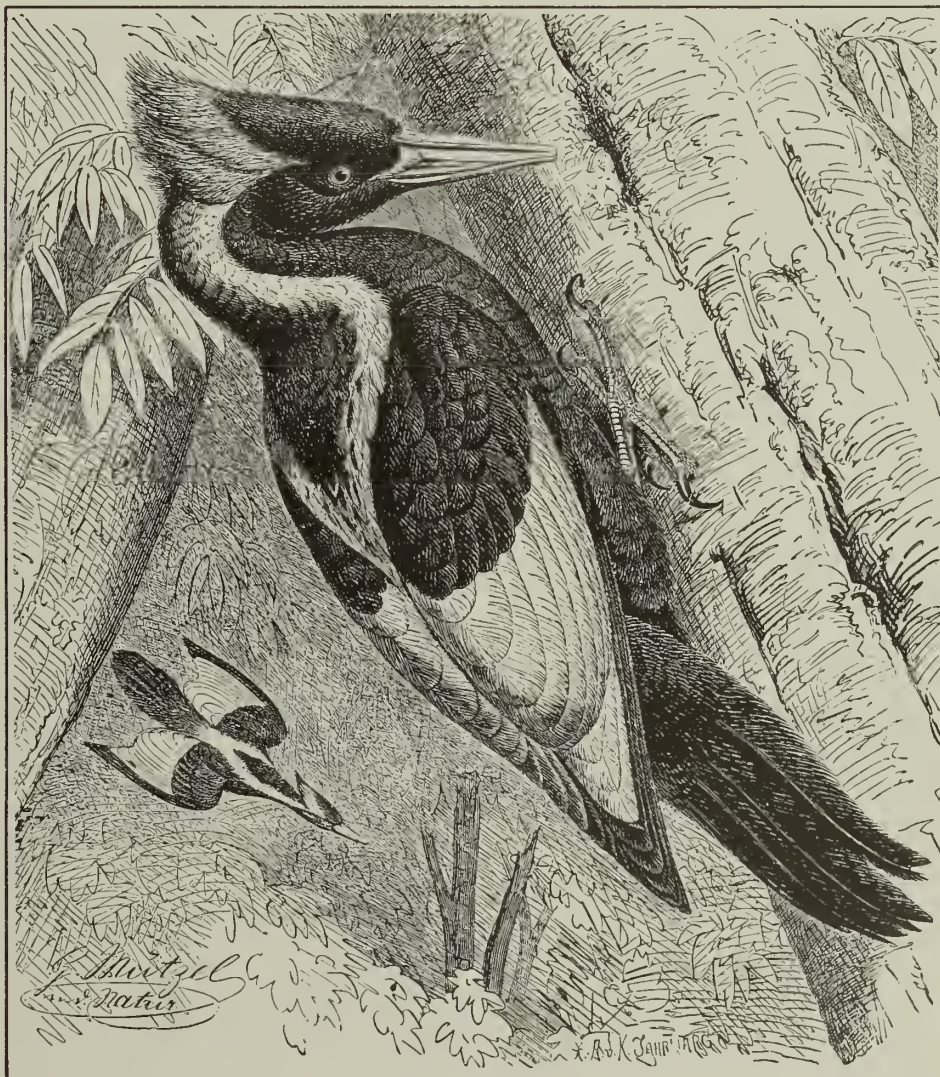
There has been little solid evidence over the last 30 years that the ivory-billed woodpecker still exists. From time to time, the Service has received reports of sightings, but most are clearly of the common pileated woodpecker. Others seemed to indicate some possibility that one or more ivory-bills were wandering around the southeastern U.S. during the 1950s and, perhaps, later decades. To the Service's knowledge, however, there has been no unanimously accepted report of live ivory-bills since the early 1950s.

In the past, data on possible ivory-billed woodpecker sightings have been withheld by some individuals on the assumption that the birds would be better protected if no one learned of their presence. While

understandable, this approach also results in a lack of knowledge for those agencies that could manage the habitat to benefit the species.

Any person, organization, or agency with biological information on the current status of this bird, if it still exists, is encouraged to write to the Regional Director, Region 2 (address on page 2) by August 8, 1985. Photographs and other confirming materials are especially solicited; however, all reports are welcome. Visual observations without supporting descriptions of the bird(s), its behavior, the habitat, and general locale would be of little value to the Service.

The Service will consider all data that it now has, as well as any new information obtained as a result of this review. Depending upon what is indicated by the data, further surveys could be initiated, a workshop held to discuss the findings, or a rulemaking prepared to delist one or both subspecies because of extinction.



The ivory-billed woodpecker: extinct?

Service Announces Petition Findings

The Service has announced findings on four petitions, three that recommended adding certain species to the U.S. List of Endangered and Threatened Wildlife and Plants and one that advocated a delisting.

1. A petition from the American Malacological Union, received by the Service on August 22, 1984, requested an Endangered or Threatened classification for the spiny river snail (*Io fluviatilis*) of Tennessee and Virginia. The Service found that this petition presents substantial information that the requested action may be warranted.

2. A joint petition from Defenders of Wildlife, the National Resources Defense Council, and the Environmental Defense Fund, received September 11, 1984, requests that the Service list the desert tortoise (*Gopherus agassizii*) as Endangered throughout its entire U.S. range (California, Arizona, and Nevada, except for Utah where it already is listed as Threatened). The Service finds that this petition also contains substantial information that the requested action may be warranted.

3. The South Carolina Wildlife and Marine Resources Department, in a petition received August 15, 1984, requested that the American alligator (*Alligator mississippiensis*) be reclassified within that State to "Threatened due to similarity of appearance," a classification that now applies to the species in Louisiana and Texas. Currently, alligators in South Carolina are

listed as Endangered or Threatened in different parts of the State. Again, the Service found that the petition contained substantial information that the petitioned action may be warranted.

4. A petition from the National Audubon Society to list the McKay's bunting (*Plectrophenax hyperboreus*) and St. Matthew vole (*Microtus abbreviatus fisheri*) as Endangered was judged by the Service as not containing substantial data that such a listing is warranted. Both animals are found on St. Matthew Island, Alaska, where a development project has been proposed. Information available to the Service indicates that, at most, 5 percent of the island would be affected.

Section 4(b)(3)(B) of the Endangered Species Act requires that, within 12 months of receipt of a petition found to present substantial information, a finding be made as to whether the petitioned action is: not warranted; warranted and a listing proposal should be published; or warranted but publication of a listing proposal is precluded by other listing activity. All comments and information received in response to the status reviews of the spiny river snail, American alligator, and desert tortoise will be considered in making such findings.

Information can be submitted to the Associate Director—Federal Assistance (OES), U.S. Fish and Wildlife Service, Washington, D.C. 20240, until further notice.

Regional Briefs

(continued from page 2)

other active bald eagle nests in Arizona this year with 24 chicks. If these fledge, this year will be another record year for bald eagle production in Arizona.

Six bald eagle chicks from Florida eggs are currently being hacked in eastern Oklahoma in the Sequoyah NWR. Radio transmitters have been attached to these birds to monitor their movements. It is hoped that these eagles will return to the refuge to nest in 4–5 years.

Plans are under way to begin masked bobwhite (*Colinus virginianus ridgwayi*) chick reintroductions on the newly acquired Buenos Aires NWR in southern Arizona. The FWS will take possession of the refuge on August 1, 1985, and stocking should begin that same month, using birds produced at Patuxent Wildlife Research Center in Laurel, Maryland. The Patuxent masked bobwhites will be "foster-parented" by wild caught, sterilized Texas bobwhites (*C. v. texanus*). Biologists are optimistic that a new population will quickly become established from these releases.

A minimum of five adult pairs of peregrine falcons (*Falco peregrinus*) are reported nesting in west Texas this year. Three additional pairs are nesting on the Mexico side of the Rio Grande and hatching has been confirmed at one eyrie there. Pesticide analysis of potential peregrine prey found in the area (doves, swallows, phoebes, etc.) is in progress. Following the nesting season, prey remains and eggshell fragments will be retrieved from all nests to determine prey utilization and the degree of eggshell thinning. This project is being conducted through the cooperative efforts of the Texas Parks and Wildlife Department, FWS, National Park Service, and The Peregrine Fund.

Region 3—In April, regional office personnel participated in two FWS Habitat Preservation field station evaluations in regard to Section 7 consultation. The evaluations were held at field stations in Green Bay, Wisconsin, and East Lansing, Michigan, and were conducted to ensure the efficiency and adequacy of the Endangered Species Program. Field station personnel were found to be doing an excellent job.

Research during the past winter months has found 11 Endangered Kirtland's warblers (*Dendroica kirtlandii*) in the Bahamas and islands to the south. This species is also believed to be existing as far south as Haiti and possibly in Cuba.

The cowbird control program for the Kirtland's warbler began on April 15, 1985. The program will set out to remove the cowbirds (*Molothrus ater ater*) from warbler nesting areas in order to increase fledgling success for this Endangered bird. In the 1970s, cowbirds caused close to a 100 percent loss of warbler production. It has been proven that with an effective cowbird control program, fledgling success can once again be great.

Research has been undertaken to determine the extent of parvo virus in wolves (*Canis lupus*) in Minnesota. As a first step, researchers are trying to determine the extensiveness of this intestinal disease and its ramifications. Parvo virus is fatal in domestic dogs (*Canis familiaris*), but not necessarily fatal in coyotes (*Canis latrans*), and thought to have some degree of fatality in wolves.

Dr. Steven Kellert has completed his comprehensive study on Minnesota residents and wolves. This study, funded by the FWS, the U.S. Forest Service, several conservation organizations, and a grant from the Mardag Foundation, was conducted to determine the various opinions and degrees of knowledge among people about the wolf. Data obtained from the study will be used to develop education programs to better inform people about the facts and myths concerning this often misunderstood animal.

Region 4—The FWS Jacksonville, Florida, Endangered Species Field Station recently concluded a formal Section 7 consultation with the Federal Highway Administration (FHWA) on the upgrading of Alligator Alley, a road that extends from Naples to Fort Lauderdale, to Interstate 75. The FWS determined that precautions provided in the biological assessment prepared by the FHWA were not sufficient, and the project as planned would likely jeopardize the survival of the Florida panther (*Felis concolor coryi*).

The major issue in this consultation was providing enough wildlife crossings under Interstate 75 at known or suspected panther crossing points to allow this species the opportunity to move northward and southward without being killed on the highway. Highway fatalities have claimed 10 panthers over the last several years, three of them occurring within the last 6 months on a one-mile stretch of Alligator Alley.

Three alternatives were determined to be feasible, with the stipulation that the

Regional Briefs

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selection of one would eliminate the jeopardy situation. The first was to elevate the roadway over four of the major wetland areas that are critical to the panther; the second was to build 25 wildlife crossings and modify 13 bridges to allow wildlife to move under the interstate; and the third was for the FHWA to initially accept a reduced number of wildlife crossings with the intent of funding an accelerated research program to better define other panther crossing points.

Knowing that this consultation was going to be controversial and that a great deal more work was going to be required, field station personnel video-taped that segment of Alligator Alley within essential panther habitat. The video film showed where the wildlife crossings were to be located and proved invaluable during briefings in Washington, D.C.

On March 7, 1985, the Jacksonville Field Station hosted a meeting to discuss preliminary recovery plans for the Endangered wood stork (*Mycteria americana*). Representatives from Federal and State agencies, water management districts, and conservation organizations, along with other concerned biologists, met to discuss wood stork recovery goals and the procedures that must be implemented to achieve those goals. Discussions focused on securing habitat for the entire life cycle of the wood stork, developing models for population dynamics and movement of wood storks, and developing public awareness of the species and wetland problems. A technical draft of a wood stork recovery plan will be developed by the Jacksonville office by the end of this fiscal year.

The U.S. breeding population of the species was listed as Endangered under the Endangered Species Act on February 28, 1984. This rule provides protection for wood storks occurring in Florida, Georgia, Alabama, and South Carolina. The decline in the U.S. breeding population is due to inadequate reproduction attributed to the reduction in the food base (mostly small fish) necessary to support breeding colonies. The reduction in the food base is attributed to loss of wetland habitat as well as changes in hydroperiods of remaining wetlands.

The Jacksonville Endangered Species Field Station is currently analyzing data contained in a recently received contract report on the Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) in preparation for a proposed rulemaking to add this bird to the Federal list of endangered wildlife. The Florida grasshopper sparrow is non-migratory and occurs only in the prairie region of south-central Florida. It prefers low brush

habitat of saw palmettos, woody shrubs, and sparse brush grass. It is a small bird, about 5 inches (13 cm) in length, colored mostly black and gray, and lightly streaked with brown on the nape and upper back. The song of this sparrow is one of the weakest of any North American song bird, having more the quality of an insect's buzz. During the breeding season, the Florida grasshopper sparrow feeds on insects, spiders, and seeds. No information is available on its winter diet.

According to the contract report, the principal reason for the decline of this sparrow and the greatest threat to its survival is habitat loss due to pasture development and/or improvement for livestock. Data contained in the report, which were obtained over a 4-year period, indicate not only that the range of the species has decreased, but that the total number of birds may now be less than 250. Most remaining populations are on privately owned lands, but one population is known to occur on Federal land at the U.S. Air Force's Avon Park Bombing Range in Polk and Highlands Counties.

The Arkansas Game and Fish Commission has proposed to protect 36 caves that provide habitat for gray bats (*Myotis grisescens*) against human disturbance by placing warning signs at entrances and by use of management structures to prevent human entry at an additional 11 caves. This is a timely proposal as a recent study by Dr. Michael J. Harvey, under contract to the Commission, indicates that there has been a 9-percent decline in the summer gray bat population in Arkansas between the period 1979-1981 (mean population size 120,700) and 1982-1984 (mean population size 109,300).

In October 1984, the FWS began an effort to live-trap Perdido Key beach mice (*Peromyscus polionotus trissyllepsis*), a subspecies proposed for listing, from a small coastal area of private land in Baldwin County, Alabama, that was scheduled for development. Over 4,000 trap nights resulted in the capture of three beach mice, which were transported to a research facility for housing in a small-mammal laboratory.

After months of planning and field work, a decision was reached to release the three captive beach mice back into natural habitat. The location chosen was Gulf State Park in Baldwin County, Alabama, an area approximately one mile (1.609 km) west of where the mice were originally captured. The release was a combined effort between the National Park Service and the FWS.

In order to enhance the chances for a successful release, an enclosure was placed one foot (.3048 m) deep on a primary sand dune. The beach mice were placed into the enclosure at dusk on Feb-

ruary 13, 1985. Within five minutes, all mice had settled down and found refuge under vegetation.

Beach mice are normally most active at night and by early the next morning, five burrows had been excavated in the primary dune. No mice were on the surface and they were presumed to be in the new burrows. From the amount of excavated material outside the burrows, it was believed that three of the burrows were not dug very deep and possibly were escape burrows, while two burrows were dug much deeper and probably were nesting chambers. The enclosure was then removed.

Use of the enclosure was felt to be an asset in this successful release because the mice were restricted to one small area that probably conserved energy and reduced stress, they were forced to dig burrows in close proximity (thereby enhancing the chances of forming a family group), and protection was provided from predation during the initial burrowing activity.

Region 5—Recovery continues for the peregrine falcon (*Falco peregrinus*) in the Northeast as evidenced by the 34 pairs of peregrines found nesting or attempting to nest this spring. Several pairs were even found at some northern mountain sites. These numbers indicate a substantial increase over last year's approximate 16 pairs of nesting peregrines.

One of the last two bald eagle (*Haliaeetus leucocephalus*) nests located at Hemlock Lake in New York State has produced at least one eaglet. This eaglet is the first one hatched since 1970. State biologists feel that this successful production is due to the help of a new female eagle that replaced the old one which was badly contaminated with DDT.

Region 6—The whooping crane spring migration began in April from Aransas NWR on the Texas Gulf Coast and will terminate 2,600 miles north at Wood Buffalo National Park in Canada. There are currently 84 birds in this main flock, 69 adults and 15 young. In addition, there are 35 birds held in captivity and 30 birds in the foster-parent flock that migrates between New Mexico and Idaho. This Endangered bird continues its slow but steady comeback from near extinction with a total of 149 birds from only 18 wild birds in 1983.

A grizzly bear (*Ursus arctos horribilis*) habitat symposium, sponsored by the Interagency Grizzly Bear Committee and the University of Montana, was held at the University of Montana in Missoula during the week of April 29. The purpose was to help participants gain a common understanding of current grizzly bear habitat

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Regional Briefs

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management activities; present recent developments and describe current conditions in grizzly bear habitat management; describe grizzly bear mapping techniques and levels of technology; and describe the cumulative effects analysis process. Proceedings from the symposium will be published as a U.S. Forest Service Intermountain Research Station General Report later in 1985.

Region 7—The trapping of a female American peregrine falcon (*Falco peregrinus anatum*) along the Tanana River on April 19 marked the earliest capture date for peregrines in Alaska. The trapping, in conjunction with an extensive banding program, provides information on movements, longevity, and health of the peregrines. This particular female was banded as a nestling in 1981, approximately 125 miles from the trap site.

The peregrine banding program has yielded numerous band returns ranging

from Washington State to Central and South America. The most recent return was that of a bird banded as a nestling on the Colville River in 1983 and recovered in southeastern Brazil in November 1984. The Bureau of Land Management and the National Park Service will cooperate with the FWS in 1985 to survey and band peregrine falcons along approximately 2,000 miles of Alaska's rivers.

Four Plants

(continued from page 1)

Because of its low numbers and restricted distribution, *C. specuicola* is susceptible to threats from water development and livestock grazing or trampling. Livestock already are being watered at two of the water sources near the plants. Accordingly, the species was listed as Threatened in a final rule published in the May 8, 1985, *Federal Register*.

The Fish and Wildlife Service does not anticipate that use of the seep-spring for livestock watering will affect, or be affected by, the Critical Habitat designation since the actual watering sites are located far enough away from the site where *C. specuicola* is found. The Bureau of Indian Affairs has informed the Service that it plans to monitor the habitat as part of a plan to develop an informal monitoring system for the resources under its jurisdiction.

Erigeron rhizomatus

A perennial herb in the aster family, *Erigeron rhizomatus* (rhizome fleabane) grows in clumps from underground stems, or rhizomes. Each clump can reach 25-45 cm (10-18 inches) high and up to 30 cm (12 inches) across. Its leaves are narrow, only up to one cm (.4 inch) long, and dark green. The plants usually reproduce clonally rather than by seed.

E. rhizomatus is restricted to 20 small populations scattered over the Datil and Sawtooth Mountains in northern New Mexico. Some occur in McKinley and Catron Counties on the Cibola Natural Forest, and some on Bureau of Land Management (BLM) property in Catron County. Given its limited distribution and low numbers (about 200 known individuals), *E. rhizomatus* is particularly vulnerable to habitat disturbance.

Most of the populations are located close to inactive uranium claims. The plants could be jeopardized if these claims are reactivated and developed without planning for the species' conservation. Road construction and the resulting erosion could also have an adverse impact on some *E. rhizomatus*

colonies unless the roads are properly planned and constructed. The population on BLM-administered land occurs on an allotment under moderate cattle grazing use. Some of the plants could be trampled and their habitat eroded if grazing levels are increased. Wildfires and certain recreational uses of the area have been mentioned as other possible dangers to the plant. Because of these threats, *E. rhizomatus* was proposed for listing as a Threatened species on April 24, 1984 (see story in BULLETIN Vol. IX No. 5). The final listing rule was published in the April 26, 1985, *Federal Register*.

A Critical Habitat designation for *E. rhizomatus* was not included in the final rule. The species occurs only on U.S. Forest Service and BLM lands, and these agencies are aware of their conservation responsibilities; therefore, no additional protection would be extended in this case by making a formal Critical Habitat designation. Section 7 of the Act requires both agencies to refrain from any action that is likely to jeopardize the species' survival. Plans to reactivate the uranium operations or increase grazing, for example, would not necessarily be prohibited, but the appropriate agency would be required to consult with the Fish and Wildlife Service.

As stated above, all four of the newly listed plants will receive protection under Section 7 of the Endangered Species Act. Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species or adversely modify their Critical Habitats.

Under Section 9, it is illegal to "remove and reduce to possession" Endangered plants, such as *Amsinckia grandiflora*, from lands under Federal jurisdiction. Regulations are being developed to extend similar protection for plants classified as Threatened. When they are completed, Section 9 will apply as well to all known *Carex specuicola* and *Erigeron rhizomatus* populations.

Interstate and international trafficking in listed plants is prohibited, except under permit. Seeds of Threatened plants are

exempt from these prohibitions if a statement of "cultivated origin" appears on their containers. However, the Service anticipates that few if any trade permits will be sought or granted since none of the four newly listed plants is common in the wild or in cultivation.

Other benefits to the plants of a listing include the requirement for the Service to develop plans for their recovery and the possibility of Section 6 funding to States and U.S. Territories with Endangered Species Cooperative Agreements. Currently, California and Puerto Rico have such agreements for plants.

Ferret Survey Training Program

The Wyoming Cooperative Fishery and Wildlife Research Unit at the University of Wyoming recently conducted two programs to train persons working for public and private agencies to properly survey areas for presence of the Endangered black-footed ferret (*Mustela nigripes*). Workshops lasted one day and consisted of classroom and field exercises. Participants were instructed in methods to survey ferrets in the daytime as well as at night, and discussions of surveys in different seasons took place. Instructors also presented information on State and Federal laws that must be complied with when conducting searches.

Participants were certified so that they can conduct these surveys in areas where it is assumed that black-footed ferrets are likely to occur. Instructors were from the Wyoming Game and Fish Department, U.S. Fish and Wildlife Service, the University of Wyoming, and private agencies.

If there is interest in this course being offered again, notify Angela Brummond at the Wyoming Cooperative Research Unit, Box 3166, University Station, Laramie, Wyoming 82071; telephone 307/766-5415.

Listing Proposals for Two Western Plants are Withdrawn

The Fish and Wildlife Service (FWS) has withdrawn proposals to list two western plants, *Hedeoma diffusum* (Flagstaff pennyroyal) and *Phlox pilosa* var. *longipilosa* (long-haired phlox), as Threatened (F.R. 3/26/85). New data indicate that both plants are more abundant and that the threats they face are not as serious as previously thought. For these reasons, the FWS determined that neither plant needs, nor is eligible for, protection under the terms of the Endangered Species Act.

Hedeoma diffusum, a perennial herb in the mint family, was proposed for listing as a Threatened species on June 29, 1983 (see story in BULLETIN Vol. VIII No. 7). At that time, the plant was believed to be restricted to 10 locations in the Flagstaff, Arizona, area and threatened by habitat loss from urban development. A subsequent survey, contracted by the U.S. Forest Service (USFS) to Dr. B.G.

Phillips of the Museum of Northern Arizona, revealed the presence of a second population center 7 miles southwest of the one previously known population center. The survey brought the total number of known *Hedeoma diffusum* sites to over 100, with more than 50 sites having at least 100 plants each and 5 sites having over 1,000 plants. Most of them are on USFS-administered lands (Coconino National Forest), and several are within the Red Rock-Secret Mountain Wilderness Area. The USFS already protects *Hedeoma diffusum* and other species on its "Sensitive Plant List," and has developed a management plan for its conservation.

Phlox pilosa var. *longipilosa* also had been proposed for listing as Threatened (F.R. 8/29/83). This plant is endemic to the Quartz Mountain area of the Wichita Mountains in southwestern Oklahoma. At the time of its proposed listing (see story

in BULLETIN Vol. VIII No. 9), it was thought to be jeopardized by quarrying, grazing, and recreational development at Quartz Mountain State Park. Later, in May 1984, a team of Federal, State, and academic volunteers conducted an intensive survey of known habitat on U.S. Bureau of Reclamation land (which is leased to Oklahoma for use as the State park). Data gained during this survey, together with the findings of a 1984 status survey by I.H. Butler, indicate that *Phlox pilosa* var. *longipilosa* is thriving. An estimated 14,000 to 20,000 plants occur on Federal lands, and the suspected threats do not appear to be as great as once thought. For these reasons, *Phlox pilosa* var. *longipilosa* does not seem to be in any danger of extinction. Should its status deteriorate in the future, however, it may be proposed again for listing.

Cinquefoil

(continued from page 6)

found that both have been relatively stable over the past 48 years. The collection pressure for herbariums that occurred during the late 1800s to early 1900s is no longer a serious threat. Ongoing research on microhabitat requirements of the plant, paralleling the reproductive biology study, will be used in the selection of sites for establishment of new reproducing colonies in potential historical habitats. The presence of newly established or

reestablished populations will reduce the chances of the species' extinction should the Monroe Flats population be lost—due, for example, to such a random event as the unauthorized landing of a military helicopter in the habitat during 1983. To date, this project has enjoyed strong support from the AMC, Fish and Wildlife Service, and U.S. Forest Service, and it has the advantage of a recovery plan that is practical and straight-forward.

Because of these cooperative efforts, there is increasing optimism for the future of the Robbins' cinquefoil.

Recovery Plan Update

Two recovery plans were approved in April: the *McKittrick Pennyroyal Recovery Plan* (4/12/85) and the *Woodland Caribou Recovery Plan* (4/12/85). Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

NOTE: In Bulletin Vol. X No. 4, we indicated that the *Bald Eagle—Pacific States Recovery Plan* was approved. This plan has not yet been approved and we apologize for the error.

Attention Readers

If you are receiving a duplicate copy of the BULLETIN, or if your office continues to receive copies addressed to individuals no longer employed by your agency, please let us know so that we can eliminate these entries from our mailing list. Please refer to the zip code as well as to the addressee when you call or write regarding changes in the mailing list. Thank you.

—The Editor



Rose Paul, Research Assistant with the Appalachian Mountain Club Research Department, surveying the habitat preferences and demograph of *P. robbinsiana* on Mt. Washington. In the background is the Crawford Path, part of the Appalachian Trail.

New Publications

Species of Special Concern in Pennsylvania, edited by H.H. Genoways and F.J. Brenner, is a "blueprint for action in saving the most endangered and threatened portions of the flora and fauna of the Commonwealth." This 430-page book, intended as a reference for use by anyone interested in conserving Pennsylvania's biological resources, contains many distribution maps, black and white photographs, and six full-page color plates. To order a copy, send \$30.00, plus \$3.00 for shipping/handling, to the Publications Secretary, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213. (Pennsylvania residents should add 6% States sales tax.)

Threatened and Endangered Plants and Animals of Maryland, the proceedings of a symposium held at Towson State University in September 1981, is now available for purchase. The 476-page volume includes 22 papers presented at the symposium, along with 8 others invited subsequently. All were fully revised and updated as of 1984. The price per copy is \$13.00 (tax and postage included). Send a check or money order to the Maryland Department of Natural Resources, Fiscal and Supportive Services Office, Tawes State Office Building, Annapolis, Maryland 21401-9974.

Part 3 of the *Atlas of the Rare Vascular Plants of Ontario* is now available. This installment, edited by G.W. Argus and C.J. Keddy, covers more than 160 species in 25 families, including the Brassicaceae, Ericaceae, Fabaceae, Poaceae, and Rosaceae. The first and second parts of the *Atlas* were published in 1982 and 1983, and are still available. Part 4, the final installment, should be available in 1986, and will automatically be sent to those receiving the earlier sections. Order the

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	20	19	234	4	0	22	299	23
Birds	59	13	144	3	1	0	220	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	30	4	11	17	3	0	65	37
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	4	0	0	12	9
Plants	69	5	1	13	2	2	92	41
TOTAL	227	47	461	58	10	37	840	212**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 178

Number of species currently proposed for listing: 29 animals
40 plants

Number of Species with Critical Habitats determined: 71

Number of Cooperative Agreements signed with States: 42 fish & wildlife
16 plants

May 3, 1985

Atlas free-of-charge from the Rare and Endangered Plants Project, Botany Division, National Museum of Natural Sciences, Ottawa, Ontario, Canada K1A 0M8.

New England's Rare, Threatened, and Endangered Plants, written by Garrett E. Crow, focuses attention on and provides a comprehensive assessment of 101 of the rarest plants in New England. A limited number of copies of this invaluable report are available free upon request from the FWS Region 5 office (see address on page 2).

The Black-footed Ferret Workshop Proceedings are now available. This publication contains 32 papers presented at a

2-day ferret workshop last fall at the University of Wyoming in Laramie. Federal, State, university, and private interests were represented. Among the topics addressed were: ferret detection and management techniques; habitat evaluation procedures; landowner relations; captive propagation and reintroduction possibilities; genetics; the various State and Federal laws protecting the species; and a variety of other material valuable to persons interested in the recovery of the black-footed ferret. Copies of the proceedings can be purchased for \$10.00 (post-paid) from the Wyoming Game and Fish Department, Special Publications-BFF, Cheyenne, Wyoming 82002.

MAY 1985

Vol. X No. 5

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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PUBLIC DOCUMENTS
DEPOSITORY ITEM

Final Protection for Seven Plants and an Insect in Ash Meadows

The Fish and Wildlife Service (FWS) has published a final rule (F.R. 5/20/85) putting seven plants and one insect endemic to the greater Ash Meadows region of Nevada and California on the U.S. List of Threatened and Endangered Wildlife and Plants. These species occur in small numbers at only a few sites in Nye County (NV) and Inyo County (CA), and are vulnerable to a number of activities that threaten their aquatic and terrestrial habitats.

Ash Meadows is an unusual desert wetland ecosystem maintained by several dozen springs and seeps, all fed by an aquifer of "fossil water" deposited more than 10,000 years ago when the region had a more mesic climate. The Ash Meadows area contains the greatest known concentration of endemic animals and plants in the continental United States, and most of them depend on the maintenance of adequate spring flows for their survival. Much of the aquatic and terrestrial habitat has been damaged or destroyed over the years by agricultural operations, drainage of wetlands for peat mining, road construction, and preliminary work on a large real estate development project. These and other means of habitat degradation jeopardized the survival of the unique plants and animals of Ash Meadows.

Four of the area's endemic fishes already are listed as Endangered. The FWS proposed listing an additional eight Ash Meadows species—seven plants and an insect—for Endangered Species Act protection on October 13, 1983 (see story in BULLETIN Vol. VIII No. 11). Subsequently, some of the threats were removed when The Nature Conservancy (TNC) bought approximately 11,173 acres in Ash Meadows from Preferred Equities Corporation, which had planned a large development complex in the area. This property was later purchased from TNC by the FWS for establishment of the Ash Meadows National Wildlife Refuge. The refuge protects some, but not all, of the designated Critical Habitat for seven of the newly listed Ash Meadows species: the Ash Meadows ivesia (*Ivesia eremica*), 45 percent on refuge lands; the Ash

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Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*)

Photo by Susan Cochrane



REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of May:

Region 1—An environmental assessment (EA) was completed recently for the proposed acquisition of approximately 2,000 acres of Coachella Valley fringe-

toed lizard (*Uma inornata*) habitat to create a National Wildlife Refuge (NWR) for this Threatened species. Editorial comments of previous drafts were consolidated, and the EA was released to the public for review through the Portland Regional Office in late April.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

The *ENDANGERED SPECIES TECHNICAL BULLETIN* is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

To date, over 400 individual San Francisco garter snakes (*Thamnophis sirtalis tetrataenia*) have been trapped, marked, and released as part of a study being conducted at the San Francisco International Airport by the California Department of Fish and Game. Funds for the study were provided by the California Department of Transportation as a conservation measure for adverse impacts from highway construction. This is the final year of the 3-year population study. Although spring trapping efforts have only recently begun, several snakes have been captured, marked/remarked, and released.

* * *

The annual survey for the 'alala or Hawaiian crow (*Corvus hawaiiensis*) on the island of Hawai'i was recently completed by Fish and Wildlife Service (FWS) staff and Hawaii Department of Land and Natural Resources personnel. The survey covers most of the species' remaining habitat. Preliminary results suggest that the population is perilously low, with only three to five birds documented as being present.

* * *

The Rocky Mountain Program of The Peregrine Fund has moved from Fort Collins, Colorado, to Boise, Idaho. There was concern as to whether or not the breeding adult peregrine falcons (*Falco peregrinus*) would adapt to their new surroundings, but by April 15, 1985, 18 females laid a total of 43 eggs. In addition, the first two peregrine chicks have hatched at the Boise Center. One chick broke out from its shell on April 12 and the second on April 14. Dr. Bill Burnham and his staff are doing an outstanding job. The peregrine program will need to provide about 80 to 90 chicks for restocking into the Rocky Mountain Area in 1985.

* * *

Region 2—Canadian Wildlife Service and FWS biologists transferred 23 whooping crane (*Grus americana*) eggs this season from Wood Buffalo National Park, Northwest Territories, Canada, to Grays Lake NWR in Idaho. Another four were transferred to Patuxent Wildlife Research Center in Laurel, Maryland. The eggs in Idaho were placed under greater sandhill crane (*Grus canadensis*) foster parents and the resulting young will add to the approximately 30 birds already in that population.

One young whooper appears ready to spend the summer at Matagorda Island, Texas, and another at Monte Vista/Alamosa NWR in Colorado. To date, nine whoopers are at Grays Lake NWR and eleven are in western Wyoming, including one in Yellowstone National Park. Other sightings have been reported in Idaho and Wyoming, but these have not yet been confirmed. Two two-bird groups have been reported as associating to-

(continued on page 10)

Four Western Species Proposed for Protection

Two birds, a fish, and a plant were proposed by the Fish and Wildlife Service (FWS) during May 1985 for addition to the U.S. List of Threatened and Endangered Wildlife and Plants. All four face a number of threats, mostly relating to habitat loss and the effects of competing animals.

Least Bell's Vireo

No songbird in California has declined as dramatically in historical times as the least Bell's vireo (*Vireo bellii pusillus*), a gray, migratory passerine. Loss of riparian habitat and nest parasitism by another bird species have brought this subspecies to the brink of extinction, and the FWS proposed listing it as Endangered (F.R. 5/3/85).

Reasons for Decline

This subspecies has very specific breeding habitat requirements—dense, willow-dominated riparian lands with lush understory vegetation—that restrict its range to the immediate vicinity of water courses. Within these areas, vireos find the food, cover, nest sites, and nestling and fledgling protection they need. Due to the limited amount of riparian habitat remaining throughout its range, the least Bell's vireo is particularly vulnerable.

Once widespread and abundant throughout California's Central Valley and other low-elevation riverine valleys, the least Bell's vireo had a breeding range that extended from interior northern California (Tehama County) to northwestern Baja California, Mexico. Today, however, over 95 percent of the riparian habitat has been lost within its former breeding range in the Central Valley, an area that may have supported 60–80 percent of the vireo's historical population.

Most of the remnants of least Bell's vireo habitat are in southwestern California. The majority of these remaining areas support fewer than five breeding pairs. After analysis of surveys conducted from 1977 to 1983, the FWS estimates that a total of about 300 breeding pairs occur in California. There are probably another several hundred breeding pairs in northern Baja California, where riparian habitat also is declining. The proposed listing rule covers all populations of the bird in the U.S. and Mexico.

Recent data indicate that the four largest remaining populations, representing about 65 percent of the bird's total U.S. numbers, occur along the Santa Margarita River (69 pairs), Santa Ynez River (60 pairs), Sweetwater River (34 pairs), and Prado Basin–Santa Ana River (25 pairs). Each of these populations is jeopardized by major urban development and water control projects planned for the near future. With the remaining 35 percent also subject to a variety of imminent

threats, the least Bell's vireo appears to be in serious danger.

Another threat is nest parasitism by the brown-headed cowbird (*Molothrus ater*), which has increased spectacularly in central and southern California since the 1930's. The cowbird lays its eggs in the nests of other bird species, usually to the detriment of the host bird's own eggs or young. Recent studies indicate that cowbird parasitism of vireo nests is occurring at a rate high enough to significantly reduce vireo reproductive success, which may lead to the extirpation of many smaller vireo populations in the future, as it undoubtedly has in the past.

Available Conservation Measures

Included in the proposal to list the least Bell's vireo as Endangered was a proposed designation of Critical Habitat for 10 areas totalling approximately 44,000 acres (18,400 hectares) in southwestern California. These areas are along the Prado Basin–Santa Ana River (Riverside County); Santa Ynez River (Santa Barbara County); Santa Clara River (Ventura and Los Angeles Counties); and Sweetwater River, Tijuana River, Coyote Creek, Jamul–Dulzura Creeks, San Luis Rey River, Santa Margarita River, and San Diego River (all in San Diego County). Detailed maps are available in the May 3, 1985, *Federal Register*.

Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its designated Critical Habitat. If an action may affect such a species, the agency involved would have to consult with the FWS. (For species that are merely proposed for listing, agencies are required only to "confer," a non-binding process.) When the needs of a listed species are considered early in the planning process, the proposed action usually can be modified to avoid jeopardy.

Types of actions that could adversely affect the proposed Critical Habitat include the removal or destruction of riparian vegetation; thinning of riparian growth, particularly near ground level (vireos typically nest within one meter of the ground); or increases in human-associated disturbances. Known proposals for projects that could require consultation include: modification of Gibraltar Reservoir on the Santa Ynez River (U.S. Army Corps of Engineers [COE] and U.S. Forest Service); a flood control project on the Santa Ana River (COE); a flood control project (COE) and highway construction project (Federal Highway Administration) along the San Luis Rey River; urban development in wetlands at Sweetwater Reser-



Photo by Herbert Clark

Least Bell's vireo

voir (COE); and a water project on the Santa Margarita River (Bureau of Reclamation and U.S. Marine Corps) at Camp Pendleton. It should be emphasized, however, that Section 7 consultations usually result in modification, rather than curtailment, of such projects. Economic and other impacts of designating or not designating Critical Habitat will be evaluated prior to a decision on a final rule.

If the proposal to list the least Bell's vireo becomes final, this bird will receive all of the benefits authorized under the Endangered Species Act. In addition to the habitat conservation measures mentioned above, there are the prohibitions on taking, possessing, and interstate or international trafficking in listed species without a permit. Further, the FWS would be required to develop and implement a recovery plan. Since California already lists the species for protection and has a Section 6 Endangered Species Cooperative Agreement with the FWS, it is eligible to apply for Federal aid to State conservation efforts for the species. A federal listing could raise the chances that such efforts might be funded.

Comments on the proposal to list the least Bell's vireo as Endangered and to designate its Critical Habitat are welcome from all interested agencies, organizations, and individuals, and should be sent to the Regional Director, Region 1 (see page 2 of the BULLETIN for address), by July 2, 1985.

Northern Aplomado Falcon

One of our most colorful birds of prey, the northern aplomado falcon (*Falco femoralis septentrionalis*), is also one of the most vulnerable. This subspecies was extirpated from the U.S. because of habitat alteration, and the remnant population in Mexico is being contaminated by pesticide residues. The FWS believes it to

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be heading toward extinction, and proposed listing it as Endangered (F.R. 5/20/85).

Adult aplomado falcons are characterized by rufous underparts, a gray back, a distinctive black and white facial pattern, long legs, and a long, banded tail. In size, they are intermediate between American kestrels (*Falco sparverius*) and peregrine falcons (*Falco peregrinus*). Northern aplomado falcons do not seem to be migratory.

The historical breeding range of the aplomado included southeastern Arizona, southern New Mexico, and southern Texas in the U.S., much of Mexico, and the western coast of Guatemala. Today, however, it is extirpated as a breeding species from the U.S., and is no longer known to nest in Guatemala or the central plateau of Mexico. According to Dean Hector, who conducted a status review for the FWS, the subspecies now nests regularly only in portions of northern and central Veracruz, northern Chiapas, western Campeche, and eastern Tabasco, mostly in palm and oak savannah.

Typical aplomado falcon habitat is open rangeland and tropical savannah containing scattered mesquites (*Prosopis juliflora*), yuccas (*Yucca elata* and *Y. treculeana*), oaks (*Quercus oleoides*), acacias (*Acacia farnesiana*), or palms (*Sabal mexicana*); in central Mexico, the falcon has been found also in open pine (*Pinus montezumae*) woodlands. The essential components of suitable habitat include relatively low ground cover, an abundance of small to medium-sized birds (some birds are among the prey species), and a supply of nesting platforms.

Considered together, these habitat requirements and the timing of the aplomado's decline in the U.S. implicate habitat degradation as the main reason for its extirpation from this country. Over the past 100 years, severe overgrazing, along with suppression of range fires and disturbances of native vegetation, have allowed brush encroachment of the open habitat. Land clearing for agriculture also contributed to the decline by reducing prey species and by eliminating nesting sites.

The most important *current* threat to the northern aplomado falcon, however, is the use of persistent organochlorine pesticides (such as DDT) within the range of this bird and some of its migratory prey species. Recent data strongly suggest that contamination from such pesticides is causing serious reproductive failure in some aplomado populations. Organochlorines interfere with the bird's ability to metabolize calcium, resulting in the formation of eggs whose shells are too thin to survive incubation. In eastern Mexico,

the levels of pesticide contamination and eggshell thinning found in the aplomado exceed even those found to have been the cause of nesting failures in the Endangered peregrine falcon in the 1960's and 1970's.

Effects of a Final Rule

Because the northern aplomado falcon was last seen nesting in the U.S. in 1952, the benefits of a final rule listing it as Endangered would be limited. The Migratory Bird Treaty Act already regulates the taking, killing, possessing, transporting, and importation of migratory birds, including all subspecies of *Falco femoralis*. Trade in all falcons is further controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora. In addition, Arizona, New Mexico, and Texas all have authority under State laws and regulations to give the bird protection if it should reappear within their borders. Since the proposed rule would list the aplomado throughout its historical range, any discovered in the U.S. would be eligible for full Endangered Species Act protection.

The main benefits of a listing would be the increased recognition of the aplomado's precarious status, which may encourage governmental or private conservation measures in Mexico, the potential for the U.S. to provide technical assistance, and the potential for reestablishing the aplomado in the U.S.

Comments on the listing proposal should be sent to the Regional Director, Region 2, by August 19, 1985.

Little Colorado Spinedace

A small fish endemic to the Little Colorado River drainage in eastern Arizona, the Little Colorado spinedace (*Lepidomeda vittata*), was proposed for listing as

Threatened (F.R. 5/22/75). Its range and numbers have been significantly reduced over the past 50 years. The decline can be traced to various forms of habitat degradation, the effects of exotic fishes, and past applications of ichthyotoxins (fish poisons).

Generally, the Little Colorado spinedace reaches less than 10 centimeters (4 inches) in total length. Its former range included parts of the upper Little Colorado River and its north-flowing, permanent tributaries on the Mogollon Rim and the northern slopes of the White Mountains. Within its current range, the spinedace inhabits very small to moderate-sized free-flowing streams, and is characteristically found in pool areas that contain flowing water over fine gravel or silt-mud substrates. During periods of drought, spinedace persist in intermittent streambed pools; during floods, however, they tend to distribute themselves throughout the stream with no apparent microhabitat preferences.

Habitat Loss

It is natural for populations of the Little Colorado spinedace, like those of many other desert fishes, to fluctuate dramatically. Historically, these fluctuations probably reflected alternating periods of drought and increased rainfall. In more recent times, however, human manipulation of the water supply has adversely affected the fish's habitat, accentuating population lows and reducing population highs. Such habitat changes could lead to the extirpation of the Little Colorado spinedace in areas that normally would have sustained the fish during drought periods.

The species' naturally restricted historical range has been significantly reduced over the past 50 years. Currently, the spinedace survives only in stretches of East Clear, Chevelon, Silver, and Nutrioso Creeks and the Little Colorado River.



The Little Colorado spinedace (*Lepidomeda vittata*) depends on clean, free-flowing streams that are free of non-native fishes.

Photo by John N. Rinne

This remaining stream habitat is on lands of private individuals, the State of Arizona, the U.S. Forest Service, and the Bureau of Land Management.

Much of the former habitat was destroyed by impoundments on the river and its tributaries. The spinedace is strictly a stream-dwelling fish, unable to exist in reservoirs, and there are now approximately 150 impoundments of various sizes within the Little Colorado River basin. Not only do these reservoirs inundate free-flowing streams, but they reduce the flow of water downstream, further shrinking or even drying-up spinedace habitat. Watershed disturbances, including the destruction of riparian vegetation, logging, road construction, urban construction, mining operations, and overgrazing, also are affecting water quality and availability. As a result, some streams have experienced siltation, organic and chemical pollution, and adverse changes in water temperatures and dissolved oxygen levels.

Predators and Poison

The impacts of exotic fishes have contributed to the decline of many native southwestern species, and undoubtedly should receive much of the blame for the reduced status of the Little Colorado spinedace. It originally was subject to few if any predatory fishes, but now at least 15 exotic species have been introduced into Little Colorado spinedace habitats. Competition, as well predation, poses a threat to the spinedace, and parasites accidentally introduced with exotic fishes may be a problem. The spread of harmful exotic species and the threat of additional introductions is exacerbated by the construction of reservoirs, an unnatural habitat type that is suited to many predatory game fishes, most of which are purposely introduced for recreational purposes.

In attempts to develop sport fishing, most of the streams in the Little Colorado River drainage have been subjected to poisoning. Chemicals such as rotenone and toxaphene were applied to kill so-called "trash" fishes, including carp, suckers, chubs, and shiners, some of them native species. Although these treatments generally were unsuccessful in eliminating the target species, they undoubtedly reduced the numbers and range of the Little Colorado spinedace.

Benefits of a Listing

If the proposal to list the Little Colorado spinedace as Threatened is made final, this fish will receive all of the protection authorized under the Endangered Species Act for listed animals. Because direct taking of this fish is not a significant threat to its survival, the listing proposal includes a special provision allowing take without a Federal permit if a State permit is obtained and all other State wildlife laws and regulations are obeyed. Arizona already

regulates take of the spinedace through the requirements for State collecting permits. This system will provide for appropriate research and conservation projects that benefit the species.

In relying upon the State's permitting system, however, the FWS is interpreting the Act as precluding any further applications of fish toxicants that could directly affect the spinedace unless done in accordance with an approved conservation plan for the species.

The special rule also acknowledges the fact that incidental take by State-licensed sport anglers is not a significant threat to the species' survival; therefore, such incidental take would not be a violation of the Act if the spinedace is immediately returned to the water.

As is often the case with other species, the habitat conservation measures contained in Section 7 of the Act are expected to be of prime importance for spinedace survival. Federal agencies are required to refrain from any action that could jeopardize the survival of a listed species or adversely modify its Critical Habitat. The proposed Critical Habitat for the Little Colorado spinedace totals about 44 stream miles (71 kilometers) along East Clear Creek (Coconino County), Chevelon Creek (Navajo County), and Nutrioso Creek (Apache County). (See maps in the May 22, 1985, *Federal Register*.)

At present, no known Federal activities would be affected by this listing proposal. On East Clear Creek, the Little Colorado spinedace habitat is primarily on the Coconino and Apache-Sitgreaves National Forests. The Forest Service does not expect any significant impact on its management of this area from this proposal since the Little Colorado spinedace is already one of its species of concern. Wilkin's Dam on Clear Creek, a proposed Bureau of Reclamation project, will require Section 7 consultation if plans for its construction are ever reactivated. No impacts of a listing are foreseen on current management of the State and private lands along either of the three creeks.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 2, by July 22, 1985.

Tumamoc Globe-berry

A rare desert-growing vine, the Tumamoc globe-berry (*Tumamoca macdougalii*), was proposed for listing as an Endangered species (F.R. 5/20/85). This plant is known to occur only in Pima County, Arizona, and Sonora, Mexico. Its survival is threatened by habitat destruction from increasing agricultural development, urbanization, and construction of a proposed aqueduct.

The only species in its genus, *Tumamoca macdougalii* is named after its dis-

coverer, D.J. Macdougal, and the site where he first collected it in 1908, Tumamoc Hill, west of Tucson, Arizona. This member of the gourd family is a perennial that grows from a tuberous root. Each plant has small, yellow, separate male and female flowers. Before they ripen, the species' small fruits are pale green with darker green stripes, resembling tiny round watermelons; when ripe, however, they turn red on the outside. After fruiting, the slender herbaceous stems die back, but new stems will sprout from the tuber the next year.

T. macdougalii is found under "nursery" trees and shrubs, which apparently provide protection, shade from the desert sun, and support for the vines. The nurse plants for this species are usually the creosote bush (*Larrea divaricata*), triangle leaf bursage (*Ambrosia deltoidea*), white thorn acacia (*Acacia constricta*), all-scale (*Atriplex polycarpa*), and pencil cholla (*Opuntia arbuscula*).

Historically, *T. macdougalii* has been found in widely scattered populations from Pima County, Arizona, to northern Sonora, Mexico. Since 1970, however, the only plants collected or observed in the United States have been in the Avra Valley, an area that is undergoing rapid development as Tucson expands westward. This valley is considered desirable not only for agriculture, but also for houses, trailer courts, businesses, and such accompanying developments as roads, powerlines, and pipelines.

In 1984, researcher F.W. Reichenbacher surveyed 53,500 acres (21,651 hectares) in the Avra Valley and located 28 populations containing 355 mature plants and 1,627 juveniles. Ten of the populations occurred on privately owned land, eight were on lands administered by the city, the State, and several local universities, and ten (comprising about 25 percent of the plants) were under Federal jurisdiction.

Potential Threats

One of the main potential threats to *T. macdougalii* and its habitat is the proposed construction of a Central Arizona Project (CAP) aqueduct, part of a large Bureau of Reclamation (BR) water diversion project. According to Reichenbacher, who surveyed the project area for rare plants, the largest known *T. macdougalii* population, which consists of about 468 plants, is on land that would be impacted by the agency's preferred CAP route. (Populations of another plant that is proposed for listing, Thornber's fishhook cactus or *Mamillaria thornberi*, also lie within the proposed aqueduct route; see story in BULLETIN Vol. IX No. 5.)

A portion of the CAP water would be allocated to the San Xavier and Papago Indian Reservations for irrigation. Independent surveys have revealed *T. macdougalii*

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on both reservations. Increased agricultural operations and future urban development of these Indian lands could have an impact on the species' habitat unless its needs are considered.

Arizona has applied for the transfer to State ownership of 6,274 acres (2,450 hectares) of land in the Avra Valley that are administered by the Bureau of Land Management (BLM). Some has already been transferred, including areas that contain two *T. macdougallii* populations. Lands obtained under the State indemnity land selections may be sold or leased in order to gain revenues for the State; such lands would then be expected to undergo development, with possible impacts on the plant.

Another population of *T. macdougallii* is on BLM-administered land near a range rehabilitation project that involves punching small holes into the ground with a large roller and then planting grass and shrub seeds. The impact (if any) of this

procedure on *T. macdougallii* is unclear; however, BLM is aware of the species' presence and is attempting to avoid or minimize any harmful effects.

Available Conservation Measures

If the proposed rule to list *Tumamoca macdougallii* as Endangered is made final, it will receive the protection authorized for plants under the Endangered Species Act. Habitat conservation probably would be the main benefit. Even though the potential for vandalism or increased collecting makes a formal designation of Critical Habitat imprudent, the habitat would receive protection under Section 7 of the Endangered Species Act. The BR would be subject to Section 7 regulations regarding the alignment for its CAP aqueduct. Whatever degree of impact may occur depends on the route chosen; two alternate routes BR is considering would avoid the main population entirely. Since *T. macdougallii* and its habitat could be affected by BLM's range project, or by the transfer or sale of cer-

tain BLM lands, that agency also may have Section 7 obligations. Another possible subject of Section 7 consultations would be developments on the Papago and San Xavier Indian Reservations involving the Bureau of Indian Affairs (BIA). The BR, BLM, and BIA all are aware of the species' presence in the lands they administer, and are actively planning for it. (*T. macdougallii* is already on BLM's "sensitive species" list.)

It is illegal under Section 9 of the Act to "remove and reduce to possession" Endangered plants from lands under Federal jurisdiction, or to engage in interstate or international trafficking in listed species, except under permit. These prohibitions will apply to *T. macdougallii* if it is listed. Another benefit of listing would be the requirement for the Service to develop and implement a recovery plan.

Comments on the proposal to list *Tumamoca macdougallii* as an Endangered species are welcome, and should be sent to the Regional Director, Region 2, by July 19, 1985.

Final Listing Actions

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Ash Meadows

Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*), 39 percent; the spring-loving centaury (*Centaureum namophilum*), 37 percent; the Ash Meadows blazing star (*Mentzelia leucophylla*), 37 percent; the Ash Meadows milk-vetch (*Astragalus phoenix*), 30 percent; the Ash Meadows gumplant (*Grindelia fraxinopratensis*), 26 percent; and an insect, the Ash Meadows naucorid (*Ambrysus amargosus*), 100 percent. Because of this limited habitat protection, the above species were listed as Threatened rather than Endangered as originally proposed. In the same final rule, one of the eight newly listed Ash Meadows species, the Amargosa niterwort (*Nitrophila mohavensis*), was listed as Endangered because none of this plant's range is included in the refuge.

Some of the threats still facing most of these species or their habitats include trampling and grazing by wild and free-roaming horses, introductions of exotic plants and/or animals, off-road vehicle use, mineral mining, road construction, and ground water depletion. Even habitat on refuge land has been damaged to an extent by activities in the past.

Available Conservation Measures

The eight newly listed species and their Critical Habitats will now receive the protection authorized by the Endangered

Species Act. Under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species or adversely modify their Critical Habitats. Included in the May 20, 1985, final listing rule were designations of Critical Habitat for sites totaling about 6,930 acres (2,800 hectares), taking into account overlaps. Ex-

cept for the Ash Meadows gumplant and Amargosa niterwort, the designated Critical Habitats include the entire known current ranges of the newly listed species.

During the public comment period, H.D. Carpenter, Director of the California Department of Fish and Game, recommended that the Service add 80 acres (32.4 ha) for the Ash Meadows gumplant

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Ash Meadows ivesia (*Ivesia eremica*)

Photo by Joseph Dowhan

Ash Meadows

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and 1,320 acres (535 ha) for the Amargosa niterwort to the designated Critical Habitat in California. Further, another 160 acres (65 ha) for the Amargosa niterwort in Nevada are being considered since the discovery of a new population in that State. Because these areas were not included in the original listing proposal, the Service will consider designating additional Critical Habitat after a 60-day comment period. Comments should be sent to the Regional Director, Region 1 (address on page 2 of the BULLETIN) by July 19, 1985.

The Bureau of Land Management (BLM) has jurisdiction over much of the

designated Critical Habitat outside the refuge. Many of the BLM's current activities are consistent with conservation of the listed species; however, mining operations and consideration of easements on BLM land are the types of activities that may require consultation with the FWS under Section 7 of the Act.

Interstate and international trafficking in listed species without a permit is prohibited. Seeds from cultivated specimens of Threatened plants are exempt from this prohibition, however, if a statement of "cultivated origin" appears on their containers. It is anticipated that few if any trade permits for the Ash Meadows species will ever be sought or issued since they are not common in cultivation or in the wild.

"Take" of the Ash Meadows naucorid also is prohibited by the Act. The rules for listed plants are different; it is illegal under Section 9 of the Act to "remove and reduce to possession" the Amargosa niterwort, which is listed as Endangered, from areas under Federal jurisdiction. Regulations to extend this protection to plants listed as Threatened have been proposed.

Among the other conservation measures provided by the Act are a requirement for the Service to develop a recovery plan for each species and the possibility of Federal funding to States that have Endangered Species Cooperative Agreements with the FWS. Currently, California is among the States having such an agreement for plants.

Florida Plant

Dicerandra immaculata, a low-growing, dome-shaped shrub belonging to the mint family, is restricted to only a few sites in Indian River and St. Lucie Counties, Florida. It grows among the sand pine scrub vegetation found on relict dunes along former ocean shorelines in a highly drained, sterile soil. *D. immaculata* is one of the rarest plants known from the sand scrub community.

Commonly referred to as Lakela's mint, *D. immaculata* is in danger of extinction throughout its range, mostly because of threats from sand mining, commercial and residential development, and a fungal disease affecting the seeds. On July 23, 1984, the Fish and Wildlife Service (FWS) published a proposed rule in the *Federal Register* to list this species as Endangered (see story in BULLETIN Vol. IX No. 8). Since that time, one of the 10 colonies then known to exist has been completely destroyed by commercial development. Two other sites have been partially destroyed by clearing for housing construction and two more face immediate threats from sand mining. These commercial and residential development activities are expected to continue and could affect most or all of the remaining colonies of *D. immaculata*. Based on this information, the Service published a final rule in the *Federal Register* on May 15, 1985, to include Lakela's mint on the List of Endangered and Threatened Plants.

As a listed plant, Lakela's mint is now eligible for the protection authorized under the Endangered Species Act. Among the benefits it receives are protection from interstate/international trafficking, a requirement for the FWS to develop a recovery plan to help secure the status of the species, and Section 7 protection from certain Federal activities.

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out

are not likely to jeopardize the survival of a listed species. At the present time, however, there are no known Federal involvements that may affect *D. immaculata*'s existence. Section 7 will apply to future activities even though a designation of Critical Habitat was not included as part of the final rule. This species is found only on small areas of privately owned lands and, with the publication of the required descriptions and maps that are part of a Critical Habitat designation, the possibility of vandalism to the plants and trespassing on its habitat may be increased, further threatening the mint's survival.



Lakela's mint

Interior Least Tern

Due primarily to the widespread loss and modification of its nesting habitat, the interior population of the least tern (*Sterna antillarum*) has been eliminated from most of its former territory in the midwestern United States. In recognition of its decline, and as a means of conserving this bird and its habitat, the Fish and Wildlife Service (FWS) has published a final rule listing it as Endangered (F.R. 5/28/85).

The interior least tern is a small bird, averaging 20–22 centimeters (7.8–8.6 inches) in length with a 50 cm (19.5 inches) wingspan. Both sexes are alike in their breeding plumage, which is characterized by a black crown, white forehead, grayish back and dorsal wing surfaces, snowy white undersurfaces, orange legs, and a black-tipped yellow bill. Breeding colonies are usually small, up to 20 nests spaced far apart, although larger colonies have been reported. Most colonies are on barren or sparsely vegetated alluvial islands or sandbars. Each nest is a simple unlined scrape on the ground and contains three brown-spotted buffy eggs.

The interior least tern historically bred along the Colorado (in Texas), Red, Rio Grande, Arkansas, Missouri, Ohio, and Mississippi River systems from North Dakota southward through South Dakota, Nebraska, eastern Colorado, Iowa, Kansas, Missouri, Illinois, Indiana, and Kentucky to eastern New Mexico, Oklahoma, Arkansas, Tennessee, central Texas, central Louisiana, and central Mississippi. Its wintering range is not known, but may include coastal areas of Central America and northeastern South America.

Under natural river conditions, the islands used by interior least terns for nesting are created and destroyed by the river's erosion and deposition processes. Periodic flooding scoured the islands of

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Fish and Wildlife Service drawing

Recovery Under Way for Small Whorled Pogonia

The Fish and Wildlife Service (FWS) approved a recovery plan on January 16, 1985, to protect and conserve the Endangered small whorled pogonia (*Isotria medeoloides*). This species, one of only two orchid species in the genus *Isotria* that is found in North America, will now have a chance to remain a self-sustaining member of the plant world.

The small whorled pogonia is an inconspicuous, slender plant ranging in size from 9.5–25 centimeters (4–10 inches) tall with hairy roots. Five or six leaves form a whorl at the top of its pale, dusty green stem which terminates with one or two yellow-green flowers. This species is currently found at scattered sites from Ontario, Canada, and Maine in the north, south along the eastern seaboard to South Carolina and possibly Georgia, and west to Illinois. Although widespread, *Isotria medeoloides* is very localized in distribution and is rare in all parts of its range. Because this plant has physical characteristics that are somewhat similar to several other plants when not in bloom, and, since it also occupies an unspecialized habitat, it could easily go unnoticed. With this in mind, biologists familiar with the orchid unanimously agree that additional populations are to be discovered.

I. medeoloides is considered the rarest orchid east of the Mississippi River, exclusive of Florida. Historically, it was known to occur in 48 counties throughout 16 States on the east coast of the U.S. and in Canada. When the species was listed as Endangered under the Federal Endangered Species Act on September 10, 1982, approximately 18 populations (sites) were known to exist, totalling about 600 surviving individuals. In the past 2 years, several large colonies were discovered and, at the end of the 1984 field season, status survey results brought the known population totals to 33 populations with at least 2,500 individual plants. The largest concentration of these plants is found in New Hampshire and Maine.

Despite the rise in known population numbers over the last several years, in some areas plant numbers are very low. For example, only one population is now known to exist in Connecticut, where at one time there were eight; the species is believed to be extirpated in the State of Maryland due to the expanding suburban sprawl of Washington, D.C.; and of 12 individual plants previously known in Michigan, only one has been observed recently. Fortunately, the Michigan Nature Association has purchased the land where the remaining Michigan individual is located in an effort to protect it.

The small whorled pogonia faces threats from two major causes—collecting and habitat destruction. At the time the species was proposed for listing (September 11, 1980), herbarium collections ac-

counted for more plants than were known to exist in the wild. This species has always been popular with wildflower enthusiasts and will probably continue to be susceptible to taking. Under the provisions of the Endangered Species Act, there is a prohibition on the taking of *I. medeoloides* from Federal lands. (Currently the only plants known on Federal lands are at Nantahala National Forest, North Carolina; Sumter National Forest, South Carolina; and Fort A.P. Hill near Bowling Green, Virginia.) However, the States of Michigan, North Carolina, Massachusetts, Virginia, and Illinois, along with the Canadian government, also have officially listed the small whorled pogonia as endangered under their own laws, giving it further protection.



small whorled pogonia (*Isotria medeoloides*)

Destruction of habitat through construction and the inadvertent loss of additional plant populations are other serious concerns. Some of the historical pogonia sites under private ownership have been lost to development of shopping malls, housing areas, and golf courses, and the trend toward habitat alteration is expected to continue, increasing the urgency of locating and protecting as many extant populations as possible. Conserving the species will require that some habitat protection strategies be developed.

Recovery Actions

The overall objective of the recovery plan for *I. medeoloides* is to establish or locate 30 populations of at least 20 individuals each. These populations must be

protected from taking and habitat alteration, and they must demonstrate long-term reproductive viability. They should be distributed throughout the species' historical range; however, at least 15 populations should be found or established in New England, a region that currently appears to include a major segment of the species' total population. Historical records indicate that the small whorled pogonia was found in approximately 60 sites, but the FWS believes that the establishment or location of 30 sites is sufficient to consider a change in the species' status from Endangered to Threatened, or possibly even a delisting.

The recovery guidelines for this species should be applied based on geographical distribution and concentrations of extant populations. Five of the six largest known populations that are considered to be the most vigorous are located in Maine and New Hampshire. These five sites have a total population of about 1,127 individuals, which represents approximately 73 percent of the species' known extant population. This high number of plants makes New England an area more conducive to the extensive field research that is needed to understand the species' biology and to assist in its recovery.

At the same time, the existing populations should be protected while areas are surveyed to identify new sites. Protection of the remaining populations of the small whorled pogonia can be accomplished by such methods as habitat acquisition, easements and cooperative agreements with landowners. For a species of such a wide range, landowner and general public awareness is probably the most efficient way to afford this plant immediate and maximum protection. Excellent success already has been achieved in protecting existing populations through the interest and support of cooperative landowners.

To further facilitate recovery for the pogonia, cooperation between State and Federal agencies should be increased. Some populations are under U.S. Forest Service jurisdiction, while others are protected by various State laws. Very often, State laws provide greater legal protection from collecting than the Federal Endangered Species Act (Act), so agreements between the FWS and authorized State agencies (as provided for in Section 6 of the Act) should be formalized whenever possible. The States of Connecticut, Georgia, Michigan, New Jersey, New York, North Carolina, Rhode Island, and South Carolina currently have Endangered Species Cooperative Agreements for plants and are therefore eligible to apply for Section 6 funds for *I. medeoloides* recovery projects.

Intensive efforts are being made to locate any additional existing populations of the small whorled pogonia not currently

Fish and Wildlife Service drawing

known to exist. With the continual loss of habitat in areas of known distribution, it is likely that unidentified sites are facing similar circumstances. However, the variation in most of the known habitat sites makes it difficult to identify other possible areas. To help minimize this problem, common factors of existing sites are being assessed, current populations are being monitored, and demographic studies are being conducted.

At the present time, too little is known about the mechanisms that control the growth and reproduction of this species. Management needs and recovery efforts cannot be properly addressed without adequate data on species biology. Studies must also be conducted to determine the association between mycorrhizal fungi and the small whorled pogonia, especially

the fungi's role in the life cycle of the species. Existing information documents that fungi assist in the development of orchid embryos by serving as a source of nutrients, and this subject should be further assessed.

As another important step toward recovery, specific management plans should be developed initially for all populations of the small whorled pogonia in excess of 100 plants. These plans should identify and discuss the implementation of actions needed to monitor the sites and/or provide the protection needed to bring about viable, self-sustaining populations. Once the management plans are put into effect for sites containing the larger populations, similar ones should be developed for the other sites.

that Wyoming will be the location of the first captive breeding site. Other States and institutions—including some outside the historic black-footed ferret range—also have expressed interest in providing such a facility. Funding for the initial operation is being sought.

The FWS has taken the position that building a captive-propagation population should be considered at this time rather than a direct trapping and translocation project since a relatively large number of ferrets will be needed to establish a new population. However, if captive propagation proves impractical, translocation may be considered.

The black-footed ferret originally ranged from Canada south to Texas, New Mexico, and Arizona. The ferrets have a close association with prairie dogs, relying on them for more than 90 percent of their food base, and utilizing prairie dog burrows for cover. Ferrets feed also on rodents, ground squirrels, and other small mammals.

During the late 1970's, some wildlife conservationists believed that the black-footed ferret had become extinct. However, Federal and State biologists continued to find evidence of the animal, which is extremely difficult to observe because almost all of its activities are nocturnal. In September 1981, a small population was discovered in northwestern Wyoming near Meeteetse. This single population represents this ferret's current known range. (See feature in BULLETIN Vol. VIII No. 3.)

The Wyoming population of ferrets is found on 18 to 20 white-tailed prairie dog (*Cynomys leuchurus*) colonies covering over 130 square miles (337 square kilometers) of primarily private ranch lands. Current estimates indicate that this population varies from about 90 to 130 animals in summer and fall, and to about 30 to 50 wintering animals that form the breeding population. Biologists observing and studying the ferrets have not determined the causes of this population fluctuation, but it is known that predators such as owls, eagles, coyotes, badgers, and bobcats sometimes take ferrets.

Black-footed Ferrets May be Bred in Captivity

U.S. Fish and Wildlife Service Office of Public Affairs Denver, Colorado

Federal and State biologists plan to take action this fall that may lead to the captive breeding and reintroduction of black-footed ferrets (*Mustela nigripes*). The program is contingent upon whether or not the nation's only known colony of black-footed ferrets continues to produce an annual population that is apparently surplus to the colony's need. State and Federal biologists plan to make such a determination by late summer 1985. Maintaining the current wild population in a healthy condition will be of prime importance.

Current plans call for possibly capturing 6 to 10 ferrets from a population that ranged to well over 100 last year. Biologists hope to produce enough of these animals in captivity to establish other healthy colonies eventually in Wyoming and elsewhere in the West. Ferrets taken

this fall will be the nucleus of a captive breeding population. Not only could such a population increase the number of ferrets available for reintroducing into the wild, but it would help to safeguard the species' survival if plague or some other disaster were to strike the sole current wild population.

At a recent meeting, the U.S. Fish and Wildlife Service (FWS) and the States of Wyoming, Montana, Colorado, and Utah agreed to establish a working group to guide recovery of the Endangered ferret. Other States within the ferret's historical range will also be invited to participate in the working group, which will coordinate ferret recovery activities and plans for propagation. Efforts will include research, management, captive breeding, and relocation site examination.

Wyoming already has evaluated seven possible sites for establishment of a captive breeding facility, and the FWS and other participating States have agreed



Wyoming Game and Fish Department photo

Establishment of a captive breeding population may greatly assist in the recovery of the Endangered black-footed ferret.

Ferret Survey Training

The Wyoming Cooperative Fishery and Wildlife Research Unit at the University of Wyoming will be hosting another black-footed ferret survey training session on October 2, 1985. There are openings for up to 30 trainees at the one-day workshop, and people with government or private agencies may participate. For information on fees and registration, contact Angela Brummond at the Wyoming Cooperative Research Unit, Box 3166, University Station, Laramie, Wyoming 82071; telephone 307/766-5415.

Nontoxic Shot Zones for Bald Eagles

During May, the Fish and Wildlife Service (FWS) took several steps toward controlling environmental contamination from the use of lead shotgun pellets. Lead poisoning from these pellets has been shown to be a significant problem for various waterfowl species and the bald eagle (*Haliaeetus leucocephalus*).

Nontoxic shot has been required for waterfowl hunting in designated areas since 1976 to prevent lead poisoning in waterfowl. Ducks and geese are known to get lead poisoning from spent lead shot pellets that they swallow while eating seeds or grit. The FWS published final regulations February 12, 1985, designating nontoxic shot zones in portions of 30 States during the 1985-86 waterfowl season.

The FWS is now establishing new, additional nontoxic shot zones to protect bald eagles because eagles sometimes feed on sick, crippled, or dead waterfowl and may ingest lead shot contained in the bodies of such birds. The new regulation, published in the May 7, 1985, *Federal Register*, designated nontoxic shot zones in all or portions of Harrison and Pottawattamie Counties, Iowa; Stafford County, Kansas; and Potter, Sully, Hughes, Hyde, Buffalo, Lyman, Stanley, Marshall, and Charles Mix Counties in South Dakota.

The regulation follows a lengthy rulemaking process that began September 14, 1984, when the FWS announced its intention to establish nontoxic shot zones to protect bald eagles and identified counties where lead poisoning in bald eagles was thought to be a problem. After reviewing biological data and public comments, the Service proposed on February 13, 1985, to establish nontoxic shot zones

for eagles in all or portions of 30 counties in 8 States—California, Illinois, Iowa, Kansas, Missouri, Oklahoma, Oregon, and South Dakota.

However, the FWS is required by law to obtain State approval for implementation and enforcement of Federal nontoxic shot regulations. In this case, the States of Illinois, Missouri, Oklahoma, California, and Oregon declined implementation of the nontoxic shot zones proposed for the protection of bald eagles for 1985. (This action does not affect nontoxic shot zones previously established for waterfowl.)

Accordingly, the FWS announced in a separate May 7, 1985, *Federal Register* notice its intention not to open waterfowl hunting on selected areas during the 1986-87 waterfowl hunting season unless the States involved approve the use of nontoxic shot on those areas. The areas include the portions of California, Oregon, Illinois, Missouri, and Oklahoma that the FWS originally proposed as nontoxic shot zones to protect bald eagles from lead poisoning.

Also to be closed in 1986-87 are four national wildlife refuges where monitoring studies indicate a waterfowl lead poisoning problem. The refuges are Stillwater, Nevada; Benton Lake, Montana; and Tule Lake and Lower Klamath, California. The FWS proposed these refuges as nontoxic shot zones for 1985 on October 30, 1984, but the respective States declined to approve the proposal.

The FWS also announced on May 7 a modified proposal on criteria to be used in determining other areas where lead poisoning in waterfowl is a significant problem and nontoxic shot should be required.

order to produce additional chicks for eventual release into the wild.

Two new bald eagle nests have been discovered on two additional river drainages in Arizona. One nest, believed to have been built last year, was found with two fledgling chicks in west-central Arizona. The adult female is most likely from the Arizona nesting population and fledged in 1979. This eagle still retains the backpack transmitter attached to it during a cooperative research project funded by the FWS. The second nest, attended by one adult and one subadult, was found on the Gila River in southeast Arizona with no eggs. This nest appears to have been built this year. Helicopter surveys, conducted cooperatively by the Bureau of Reclamation, the Arizona Game and Fish Department, and the FWS, discovered both nests in cottonwood trees. These discoveries bring the total number of occupied bald eagle nesting sites in Arizona to 18, the highest known to date. The FWS expects this to be the best reproductive season for the bald eagle in Arizona since record-keeping began, with the possibility that up to 23 chicks could be fledged.

During the FWS's annual winter waterfowl surveys in Baja California, Mexico, two new bald eagle nest sites were discovered. One adult was observed in the area as well. Neither nest was successful in producing chicks this year.

During the 1985 whelping season, the red wolf (*Canis rufus*) captive breeding program produced four litters totaling 17 pups, while the Mexican wolf (*Canis lupus baileyi*) captive breeding program produced one litter of three pups. Twelve of the red wolf pups survived, bringing the captive red wolf population to its current high of 66 animals distributed among six facilities. All of the Mexican wolf pups lived, bringing the captive population of that gray wolf subspecies to 30 animals distributed among three facilities.

The red wolf is considered extinct in the wild, while the Mexican wolf is rapidly nearing extinction in the wild. For the time being, captive maintenance is the only hope for both wolves; however, the long-range objective for both programs is to reestablish populations in the wild. Biologically, the animals in both programs have a virtually unlimited breeding potential, but responsible management of the breeding facilities dictates that production be limited to a few litters each year. Efforts are under way to increase the number of participating facilities in each program in order to expand the total population.

Region 2 has contracted with the Oklahoma Cooperative Fish and Wildlife Research Unit at Oklahoma State University to conduct a management study of the Ozark big-eared bat (*Plecotus*

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gether on a regular basis. It is not known if these associations indicate pairing-type activity among sexually immature birds or more serious pair interactions.

* * *

Dexter National Fish Hatchery reports the successful spawning of the Endangered Colorado squawfish (*Ptychocheilus lucius*) and the razorback sucker (*Xyrauchen texanus*). Nineteen Colorado squawfish produced 1.5 million eggs from which hatchery personnel estimate 600,000 fry will be hatched for eventual stocking in central Arizona streams as part of experimental, "non-essential" populations. Eight million razorback sucker eggs were spawned with 2 million fry stocked in four tributaries of the Salt River in Arizona. An additional 100,000 razorback sucker fingerlings will be stocked in Arizona soon.

* * *

Results of the annual cooperative statewide census conducted by the FWS, the Texas Parks and Wildlife Department, and the University of Texas on the Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*) indicate that the total 1985 population is down 12 percent from 1984. The prairie chicken population on the Attwater Prairie Chicken NWR, however, is at an all-time high of 206 birds, a 23-percent increase from 1984. In off-refuge portions of Colorado County, where the refuge is located, prairie chicken numbers are down 20 percent. These figures illustrate the key role that the refuge plays in the conservation of this species.

* * *

A bald eagle (*Haliaeetus leucocephalus*) chick recently hatched at the Rio Grande Zoo in Albuquerque, New Mexico. The chick will probably be utilized in the FWS's captive breeding program in

townsendii ingens) in Oklahoma. Of the five Townsend's big-eared bat subspecies in North America, both the Ozark and Virginia big-eared bats (*P. t. virginianus*) are listed as Endangered. Historically, the Ozark big-eared bat occurred in adjacent areas of Oklahoma, Arkansas, and Missouri. Today, however, the total population is estimated to be less than 450 bats, about equally split between Oklahoma and Arkansas. The subspecies may be extinct in Missouri. It is currently thought that the greatest threat to this subspecies is human disturbance of maternity and hibernating colonies in Ozark caves. The study is expected to take 5 years, and is being initiated in cooperation with Regions 3 and 4.

* * *

Region 3—The Region 3 endangered species staff met with the Wisconsin Department of Natural Resources and the U.S. Forest Service on May 13 to discuss comprehensive planning for the two national forests in Wisconsin—Nicolet National Forest and Chequamegon National Forest. The major topic of discussion was the future management of the timber wolves (*Canis lupus lycaon*) and the bald eagles that occupy these forests.

* * *

Six peregrine falcons will be released in the near future from the Multi-Foods Tower (owned by a Canadian firm, Oxford Properties, Ltd.) located in downtown Minneapolis. The birds were placed at the tower on May 21. This project is the joint effort of the Minnesota Department of Natural Resources, the FWS, The Nature Conservancy, and several other conservation groups.

* * *

Region 4—A status survey of the Nashville crayfish (*Orconectes shoupi*) has recently been completed. Based on the study's results, the species appears to qualify for Endangered Species Act protection. The Nashville crayfish has historically been collected from four river systems in Tennessee, three of them tributaries of the Cumberland River and one a Tennessee River tributary. However, the recent studies have found the species to be restricted only to Mill Creek, a Cumberland River tributary in Davidson and Williamson Counties, Tennessee. Mill Creek lies within the greater Nashville metropolitan area, and the species is threatened by developmental pressures within the watershed. The Nashville crayfish's restricted range also makes it extremely vulnerable to a single catastrophic event, such as a chemical spill. Meetings have been held with Federal, State, and local agencies to discuss the species' status and the measures taken to protect it and its habitat.

* * *

In April, personnel with the FWS Asheville Endangered Species Field Office met with personnel from the U.S. Forest Service and the Tennessee Heritage

Program to survey Blue Ridge goldenrod (*Solidago spithamea*) sites on National Forest lands in North Carolina and Tennessee. Potential management options, including the possible designation of some sites as Research Natural Areas, were discussed. Only three populations of this rare goldenrod, recently listed as Threatened, are known to exist. Similar work with the National Park Service (NPS) resulted in discovery of two new potential localities for this species adjacent to an unfinished section of the Blue Ridge Parkway. The FWS is working with the NPS in this area to avoid impacts from a proposed trail system on the plant and on nearby caves used by Virginia big-eared bats.

* * *

University of Florida researchers recently received funding from Florida's new Nongame Wildlife Program to study declining populations of the Endangered Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*), a species currently restricted to a few of the Florida Keys in Dade and Monroe Counties. The research will focus on the status and habitat needs of this rare butterfly. Initial work in May 1985 started mark-recapture studies for the species. The new studies build on work previously funded by the FWS to determine the species' current distribution.

* * *

Nevius' stonecrop (*Sedum nevii*), a Category 2 listing candidate, is a plant historically known from only four locations, with two populations in Alabama and one each in Georgia and Tennessee. Recent field work in Alabama by the Jackson, Mississippi, field office staff, in combination with local botanists, has resulted in the discovery of six additional populations in Alabama. Previously thought to be restricted in Alabama to Tuscaloosa and Bibb Counties, the range of *Sedum nevii* is now known to include Jefferson and Talledega Counties. Further field work will be conducted to determine its rarity and to accurately assess the threats to this species.

* * *

One of the primary threats to gopher tortoise (*Gopherus polyphemus*) populations is the taking of individuals for food, sale, and pets. The loss of mature gopher tortoises is magnified by the length of time required by the species to reach maturity and by their low reproductive rate. This loss is particularly significant in Mississippi where the remaining limited habitat is fragmented. Recently, the supervisor of the national forests in Mississippi signed an order prohibiting the hunting and possession of the gopher tortoise, a Category 2 listing candidate, and the hunting of any wildlife species by the practice of "gassing" or the introduction of chemicals into burrows. Violation of this order is punishable by fine and/or imprisonment. The executive director of the

Mississippi Department of Wildlife Conservation wrote a letter of support, stating that the order would facilitate their efforts to control poaching, and offering the assistance of State officers in controlling illegal take of gopher tortoises.

* * *

Region 5—Twelve young Plymouth red-bellied turtles (*Pseudemys rubriventris bangsi*) that are being "head-started" by personnel at the New England Aquarium in Boston, Massachusetts, are doing exceptionally well, showing rapid growth rates. As part of the recovery program for this Endangered species, all 12 turtles will be released in several Plymouth County, Massachusetts, ponds in late July.

* * *

Early indications are that bald eagle production in Maine and the Chesapeake Bay region will reach record highs this year. Following completion of eaglet banding, final numbers will be available. Also, preparations for the Canadian/United States eagle translocation project are under way with plans made to place up to 36 young birds into the States of Pennsylvania, New Jersey, and Massachusetts.

* * *

Region 6—On May 22, 1985, the steering committee for the Platte River coordinating effort met in Denver for the third time this spring. This effort, sponsored by the Bureau of Reclamation, is to spearhead a joint program for resolving conflicts between water development and the habitat requirements of the Endangered whooping crane, the Endangered interior least tern (*Sterna antillarum athalassos*), and the piping plover (*Charadrius melodus*), which is proposed for listing, as well as other nonlisted species. Representatives from the States of Colorado, Nebraska, and Wyoming, numerous Federal agencies, and private environmental and water development groups are participating in this effort. It is anticipated that recommendations will be developed through further study of the river and comprehensive data analysis, and will be ready for implementation in late 1986. A working group was established at this meeting to develop a plan of action for the committee to follow.

* * *

On May 24, 1985, the steering committee for the Upper Colorado River Basin coordinating effort met in Denver to continue discussions aimed at resolving conflicts between water development and Endangered fish in this river basin. The effort, initiated in May 1984, is expected to produce a list of recommendations by this fall. As with the Platte River program, this is the effort of several State and Federal agencies and private groups. Analysis of data collected on the river is proceeding rapidly, and the committee will

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begin to move into the next phase which includes the generation of recommendations to resolve the conflicts.

Grizzly bears (*Ursus arctos horribilis*) are not faring too well this year. This spring, three bears—two females and one yearling male—have been accidentally killed. One female was killed by a car and one was killed by a train in an area south of Glacier National Park. The male was accidentally killed by a hunter near Chateau, Montana. The FWS and the U.S. Forest Service are investigating these incidents.

Least Tern

(continued from page 7)

most vegetation, keeping them open enough for tern nesting. Over the past 70 years, however, the extensive systems of of reservoirs and other water management projects throughout the greater Mississippi River drainage has so regulated natural processes that fewer islands are being created, while some have been inundated under impoundments. Moreover, the scouring effect of spring floods has been reduced so much that open nesting habitat on remaining islands is being crowded out by permanent vegetation.

As a result of these and other pressures, including predation and disturbance by people using the islands for recreation, the interior least tern survives only in remnant populations. About 1,400 to 1,800 are thought to remain. In fact, the interior least tern already is officially listed (under State law) as endangered in South Dakota, Iowa, Illinois, Missouri, Texas, and New Mexico; as threatened in Kansas and Nebraska; and as extirpated in Indiana. The FWS proposal to list the

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	20	19	234	4	0	22	299	23
Birds	60	13	144	3	1	0	221	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	30	4	11	17	3	0	65	37
Snails	3	0	1	5	0	0	9	7
Clams	22	0	2	0	0	0	24	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	9
Plants	71	5	1	19	2	2	100	41
TOTAL	230	47	461	65	10	37	850	212**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 178

Number of species currently proposed for listing: 29 animals
33 plants

Number of Species with Critical Habitats determined: 79

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

May 31, 1985

interior least tern under the Federal Endangered Species Act as Endangered was published in the May 29, 1984, *Federal Register* (see story in BULLETIN Vol. IX No. 6).

Under the Endangered classification, a number of benefits are now available for the interior least tern. It will receive additional protection from take, possession, or interstate/international sale without a permit. Those States having Endangered Species Cooperative Agreements with the FWS may receive some Federal funding for their own conservation efforts. The FWS will be responsible for developing and implementing a recovery plan.

Habitat protection, authorized under

Section 7 of the Act, may be the most beneficial for the tern. Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of Endangered species. If a proposed activity may affect a listed species, the appropriate agency must consult with the FWS to find ways of avoiding jeopardy. Among the types of actions that may require consultation are construction and operation of reservoirs, river channelization projects, and water management practices. In most cases, if the needs of the species are considered early enough in the planning process, an activity may be able to proceed with some modifications.

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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Final Action Taken on Eight Species

Two fishes, a mollusk, a plant, and three mouse subspecies were added recently to the U.S. List of Endangered and Threatened Wildlife and Plants. The legal status of another species, the American alligator, was changed for those occurring in Florida.

Modoc Sucker

Final action has been taken on protecting the Modoc sucker (*Catostomus microps*), listing this fish as an Endangered species and designating its Critical Habitat (F.R. 6/11/85). A victim of habitat loss and the effects of non-native fishes, the Modoc sucker has declined dramatically in both numbers and range.

Historically, the Modoc sucker occurred in small tributaries of the upper Pit River in Lassen and Modoc Counties, California. Its preferred habitat consists of small streams with shallow pools, cover, soft sediments, and clear water. During its spring spawning runs, the Modoc sucker ascends creeks that may be dry during summer months.

Overgrazing and other land uses that cause erosion and siltation have seriously degraded water quality in Modoc sucker habitat. The destruction of natural instream barriers (such as waterfalls) due to erosion and channelization has allowed another species, the Sacramento sucker (*C. occidentalis*), to invade much of the Modoc sucker's habitat. Hybridization between the two species has eliminated genetically pure Modoc suckers from many streams. Another fish, the brown trout (*Salmo trutta*), was introduced to the area for sport fishing and has reduced Modoc sucker numbers by predation.

These factors have combined to bring the Modoc sucker to the brink of extinction. As recently as 1978, a California Department of Fish and Game survey found the species to be in decline but still present in eight creeks; by 1980, however, it survived in only three creeks, and its numbers had been reduced to about 1,300. The State of California reclassified the Modoc sucker in 1980 as endangered, and the Fish and Wildlife Service (FWS) proposed a Federal listing as En-

dangered on January 31, 1984. (See story in BULLETIN Vol. IX No. 2.)

The June 11, 1985, final listing rule brings the Modoc sucker under the full protection of the Endangered Species Act, reinforcing the prohibition contained in California law against take of the species and adding needed habitat protection. Included in the final rule was a designation of Critical Habitat for a total of approximately 26 miles (32 kilometers) of the following streams and a 50-foot (15.2 meter) riparian zone on either side of the channel: Turner Creek; Rush Creek; Washington Creek; Hulbert Creek; and Johnson Creek. Maps of these areas are published in the June 11, 1985, *Federal Register*.

Since approximately 50 percent of the land containing the Modoc sucker's current range is managed by the U.S. Forest Service (USFS), it is anticipated that the USFS will be consulting with the FWS under Section 7 of the Act on logging plans and grazing leases along streams that are designated as Critical Habitat. Before the listing rule became final, the USFS voluntarily eliminated grazing in some riparian areas and modified timber sales along Hulbert and Cedar Creeks. If plans for a Bureau of Reclamation dam on the Pit River are reactivated, that agency also will be required to consult in order to avoid adverse modification of the Modoc sucker's habitat.

A cooperative effort by the FWS, USFS, and California Department of Fish and Game to reestablish the species in parts of its historical range has been initiated. In fact, it has already been reestablished in Turner Creek. It is possible that this program of habitat rehabilitation and reintroduction could become a higher funding priority as a result of the Endangered classification.

Niangua Darter

The Niangua darter is a small, slender fish with eight dark crossbars on its back. Known only from a few tributaries of the Osage River in west-central Missouri, the species inhabits clear, medium-sized streams with shallow pools and silt-free

gravelly or rocky bottoms. In 1978, Dr. William L. Pflieger of the Missouri Department of Conservation reported eight populations of the Niangua darter along 128 miles (206 km) of streams in the Osage River basin. Within this region, the species is rare and localized in occurrence.

One of the eight populations known in 1978 has already been extirpated due to inundation of its free-flowing habitat by Truman Reservoir on the Little Pomme de Terre River. The impoundment also acts as a barrier to the movement of darters between habitable streams, thereby isolating some of the remaining populations and making them more vulnerable. Further, artificial reservoir habitat is ideal for the spread of some non-native sport fishes, including already introduced species that are potential predators on the Niangua darter.

A continuing threat to the species' habitat is stream channelization, a practice often associated with flood-control projects and highway or bridge construction. The widening and straightening of stream channels seriously disrupts stream ecosystems by eliminating pools, altering natural flow patterns, disturbing substrates, removing cover, and causing increased siltation.

Based primarily on data submitted by the Missouri Department of Conservation, the FWS proposed on April 17, 1984, to list the Niangua darter as a Threatened species and to designate its Critical Habitat (see BULLETIN Vol. IX No. 5). The June 12, 1985, final rule gives this fish protection under the Endangered Species Act. A total of about 90 miles (145 km) of currently occupied streams, in segments within seven Missouri counties, was determined to be the best remaining habitat and was designated as Critical Habitat. A 50-foot (15.2 meter) riparian zone along each side was included to help maintain water quality. (See maps in final rule.) There are no known current or planned Federal activities that may affect the species.

The final rule also includes a provision allowing take of the species for conservation purposes if a State collecting permit is first obtained and all other State laws and regulations are followed.

(continued on page 6)



REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of June:

Region 1—A drastic decline in the California condor (*Gymnogyps californianus*) population occurred during the

winter of 1984–85 and spring 1985. Fifteen condors were confirmed in the wild in October 1984, but only nine could be accounted for this spring. Only one of the missing six birds has been recovered; an autopsy revealed that it died of lead

poisoning. Also, while five pairs bred in 1984, only one pair bred in 1985. This pair laid three eggs which were taken from the nest. Two successfully hatched and one died early in incubation.

The captive population currently numbers 19—7 males, 10 females, and 2 undetermined. In response to this catastrophic decline, the Fish and Wildlife Service (FWS) is planning to trap additional free-flying birds to bolster the captive flock. Concurrently, an artificial feeding program will be maintained year-round to provide a clean food source for wild condors, and all remaining wild condors will be radioed.

The FWS Sacramento Endangered Species Office (SESO) staff met with developer representatives who have proposed to construct a golf course/residential complex in Newark, California. Pickleweed-dominated wetlands are interspersed throughout the 125-acre project site. At the request of SESO, the developer sponsored a trapping study and caught over 40 salt marsh harvest mice (*Reithrodontomys raviventris*), an astounding number as compared to the typically poor trapping success in other areas throughout the range of this species.

SESO has also been working closely with the city and county of Sacramento to protect valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) habitat within the American River Parkway. Management of the California Exposition parcel, a major habitat area within the parkway, was recently turned over to the county of Sacramento for management. This increases the chances for restoring the beetle's habitat along the American River.

Four suspected specimens of the valley elderberry longhorn beetle were recently collected from along the upper Sacramento River between Colusa and Red Bluff. This collection extends the known range of the beetle to more than 100 miles north of any previous sites. The specimens have been sent to taxonomic experts for subspecies verification.

The FWS and the California Department of Fish and Game (CDFG) jointly completed the Spring 1985 sea otter (*Enhydra lutris nereis*) count with the following results (1984 results included for comparison):

	Independents	Pups	Total
June 1984	1181	123	1304
May 1985	1125	236	1361

The Governor of California signed legislation on May 24, 1985, that prohibits the use of gill and trammel net fishing within the sea otter range. Prompted by the

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Two Southwestern Fishes Proposed for Listing

During June, the Fish and Wildlife Service (FWS) took steps to conserve two rare fish species. The spikedace and the loach minnow were proposed for listing as Threatened because of the threats to their survival posed by habitat loss and the impacts of non-native species.

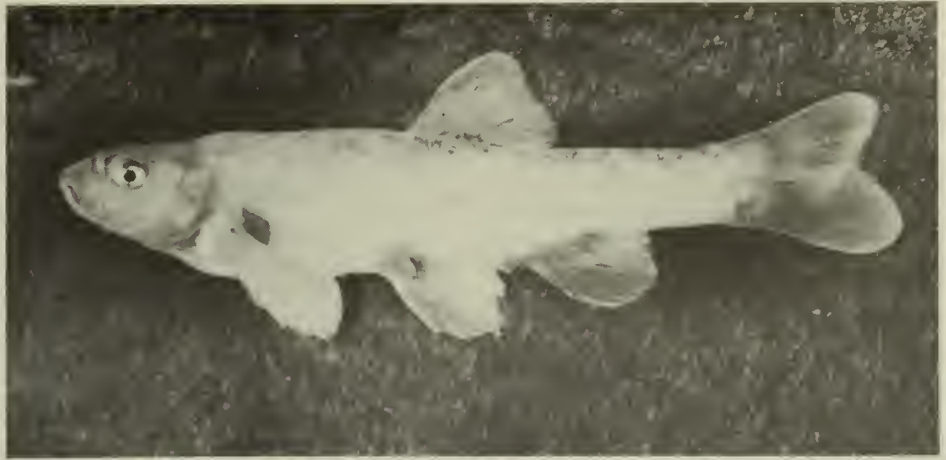
Spikedace

The spikedace (*Meda fulgida*) is a small, silvery fish endemic to parts of the greater Gila River drainage in Arizona and New Mexico. Within this region, it was once common throughout much of the Verde, Agua Fria, Salt, San Pedro, San Francisco, and Gila (upstream of Phoenix) Rivers, occupying suitable habitat in both the mainstreams and their perennial tributaries.

For the spikedace, suitable habitat consists of shallow riffle areas over gravel/rubble substrates with moderate to swift currents, and pools with swiftly flowing water over sand or gravel substrates. Due to widespread habitat alteration and the harmful effects of introduced fishes, the spikedace has been eliminated from approximately 94 percent of its former range. Continuing threats to most of the remaining remnant habitats led the FWS to propose listing the spikedace as Threatened (F.R. 6/18/85).

The San Pedro River, once a perennial stream, is now severely dewatered and has only intermittent flow. Historically, the spikedace's range on the San Pedro River reached into northern Sonora, Mexico. This stretch of the upper river is now dry. Both the lower Salt and Verde Rivers have a very limited flow or no flow during portions of the year, due to agricultural diversion and upstream impoundments, and both rivers have several impoundments in their middle reaches. After leaving the Mogollon Mountains in New Mexico, the Gila River is affected by agricultural and industrial water diversion, impoundment, and channelization. It also has been subjected to use of chemicals for fish management from the Arizona border downstream to San Carlos Reservoir. The San Francisco River has suffered from erosion and extensive water diversion and now has an undependable water supply throughout much of its length.

Due in large part to these habitat losses, the spikedace currently survives only in approximately 24 kilometers (15 miles) of Aravaipa Creek, Graham and Pinal Counties, AZ; 57 km (35.5 miles) of the Verde River below Sullivan Lake in Yavapai County, AZ; and 73 km (45 miles) of the upper Gila River in Grant and Catron Counties, NM. The 154 km (95.5 miles) of currently occupied range represent only 6 percent of the species' historical range, and even these habitat remnants are threatened.



Tiaroga cobitis (loach minnow)

Photo by J.E. Johnson

Ownership of the lands containing the remaining spikedace streams is mixed. Some areas belong to private individuals, conservation organizations, and the States of Arizona and New Mexico, while others are administered by two Federal agencies, the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). Two other Federal agencies, the Bureau of Reclamation (BR) and the Army Corps of Engineers (COE), are considering water development projects that could have an impact on current spikedace habitat. In addition to the loss of habitat by inundation and the changes in natural streamflow patterns that would result from the construction of other impoundments, disturbances in the upper watershed could lead to siltation and other water quality problems downstream.

Even the sections of spikedace habitat currently being managed for the fish's survival are vulnerable to outside pressures. For example, Aravaipa Creek flows through a BLM wilderness area and a preserve owned by Defenders of Wildlife, but the habitat could be degraded by any practices in the upper watershed that might pollute or deplete the streamflow. Similar problems could face protected spikedace habitat along the Gila River, including sections in the USFS Gila Wilderness and the small stretch of river (upstream from the town of Gila) owned by The Nature Conservancy. In fact, spikedace in the Gila River system appear to be in particular trouble; a 1983-84 study by the New Mexico Department of Fish and Game documented a 40 percent loss of range in the Gila just since 1978.

The spikedace's chances for survival in the Gila River depend on the proposed Upper Gila Water Supply Study, part of the Central Arizona Project. Currently, the BR, which is responsible for the project, is studying four water management approaches, all of which appear to pose direct and indirect threats to the species' habitat. Spikedace survival in the Verde

River may depend on other Central Arizona Project water development activities. The BR is presently studying plans for water diversion in the upper Verde River to eight potential user groups.

In addition to habitat loss, the spikedace faces serious problems relating to non-native fishes. A number of exotic species are believed to be preying on and competing with the spikedace. Many of these species were introduced for sport fishing and have thrived under altered habitat conditions. The problem could be exacerbated by construction of new reservoirs; not only do dams eliminate free-flowing habitat and favor the spread of some non-native species, but they control the recurring floods that help spikedace maintain a competitive edge over the invading exotics.

If the FWS proposal to list the spikedace as a Threatened species is made final, this fish and its habitat will receive protection through the Endangered Species Act. The conservation measures authorized under the Act generally include controls on taking, possessing, and interstate or international trafficking in listed species without a Federal permit. The FWS is required to develop and implement a recovery plan for listed species, and Federal funding for State-sponsored conservation programs could become available if the State has an approved Endangered Species Cooperative Agreement with the FWS. (Currently, New Mexico has such an agreement for listed animals). These measures would supplement the protection already provided to the spikedace by Arizona and New Mexico under their own State endangered species laws.

Habitat conservation would probably be the main benefit of a listing. Under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its Critical Habi-

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Two Fishes

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tat. The proposed Critical Habitat for the spikedeace totals approximately 155.5 km (96.5 miles) along stretches of Aravaipa Creek, Verde River, Sycamore Creek, and the upper Gila River. (See maps in the June 18, 1985, *Federal Register*.)

On USFS and BLM-administered lands, listing the spikedeace is expected to have few if any effects on current management. The BR and COE, however, are considering actions on the Gila and Verde Rivers which may adversely affect the spikedeace. All Federal agencies would be required to consult with the FWS on ways to avoid any adverse effects from their activities that may affect this fish.

Since habitat loss and the effects of non-native fishes are the only serious threats to the spikedeace, the proposed listing rule included an exception to the general prohibitions on the take of listed species. Taking of spikedeace would be allowed in accordance with State wildlife laws and regulations if limited to scientific, educational, and other conservation purposes that are consistent with the Endangered Species Act. Both Arizona and New Mexico already regulate take of the spikedeace through the requirement for State collecting permits, and a separate Federal permit would not be required for this species. The proposed rule also recognizes that sport fishing is not a threat to the species; therefore, incidental take of a spikedeace by State-licensed anglers would not constitute a violation of the Act if the fish is immediately returned to the water.

Comments on the proposal to list the spikedeace as a Threatened species and to designate its Critical Habitat are welcome from all interested agencies, organizations, and individuals, and should be sent to the Regional Director, Region 2 (address on page 2 of the BULLETIN) by August 19, 1985.

Loach Minnow

Many of the threats to the spikedeace also face another fish native to the Gila River drainage of Arizona and New Mexico, the loach minnow (*Tiaroga cobitis*). In fact, both species occupy some of the same habitat.

The loach minnow inhabits shallow, turbulent riffle areas with cobble substrates, swift currents, and growths of filamentous algae. It also needs periodic flooding of its habitat, not only to control invasions of exotic fishes, but to keep the substrate free of embedding sediments. Once locally common throughout much of the Verde, Salt, San Francisco, San Pedro (including the upper stretch in Sonora, Mexico), and Gila (upstream from

Phoenix) Rivers and their perennial tributaries, the loach minnow occupied about 2,600 km (1,615 miles) of stream habitat. Due to habitat degradation and exotic fishes, however, it now is restricted to 380 km (236 miles), or about 15 percent, of its former range. The factors that led to this decline continue to jeopardize the loach minnow, and the FWS has proposed listing it as Threatened (F.R. 6/18/85).

Many parts of the loach minnow's former habitat have been eliminated by reservoir construction, excess groundwater pumping, siltation, and other water quality problems. Much of what remains has been contaminated by invasions of exotic fishes. Currently, the loach minnow is known to survive only in approximately 24 km (15 miles) of Aravaipa Creek in Graham and Pinal Counties, AZ; 93 km (58 miles) of the upper Gila River in Grant and Catron Counties, NM; 167 km (104 miles) of the San Francisco and Tularosa Rivers, also in Catron County; the lower 1.5 km (.9 mile) of Whitewater Creek, again in Catron County; and 95 km (59 miles) of the Blue River in Greenlee County, AZ. Land ownership within the loach minnow's range is mixed and includes lands administered by the USFS and BLM.

Past water management projects have already eliminated the loach minnow from much of its historical range. The BR's Upper Gila Water Supply Study alternatives pose the same threats to the loach minnow that they do to the spikedeace. Habitat modifications could further reduce free-flowing stream habitat and facilitate the spread of harmful exotic species.

Included in the proposal to list the loach minnow as Threatened were proposed designations of Critical Habitat for stream segments totalling approximately 257 km (160 miles). (See maps in the June 18, 1985, *Federal Register*.) These locations contain the best remaining habitat and provide the loach minnow with its greatest opportunities for survival and eventual recovery. Under Section 7 of the Act, any Federal agency whose activities may affect a listed species or its habitat are required to consult with the FWS.

If the listing proposal becomes final, the loach minnow will receive Endangered Species Act protection similar to that proposed for the spikedeace, including the exception for State-regulated take. Both Arizona and New Mexico consider the loach minnow a threatened or endangered species under their own conservation laws.

Comments on the proposal to list the loach minnow as a Threatened species and to designate its Critical Habitat are welcome, and should be sent to the Regional Director, Region 2, by August 19, 1985.

Review of Three Mammals in Nepal

In a June 14, 1985, *Federal Register* notice, the Fish and Wildlife Service (FWS) initiated a review of the status, within the country of Nepal only, of three large mammals: the leopard (*Panthera pardus*), goral (*Nemorhaedus goral*), and serow (*Capricornis sumatraensis*). This review is based on information submitted by the Government of Nepal, which suggests that reclassifying the animals from Endangered to Threatened and issuing regulations allowing limited importation into the U.S. of trophies taken in Nepal by hunters may be warranted.

The leopard is the world's most widely distributed large cat, occurring in most of Africa and Asia. Currently, it is listed as Threatened in parts of sub-Saharan Africa and as Endangered everywhere else. Both the goral and the serow, distant relatives of the sheep and goat, are found in eastern Asia and are listed as Endangered. Recent letters from Nepal's Department of National Parks and Wildlife Conservation indicate that: 1) all three species are widely distributed in Nepal; 2) they are not in immediate danger of extirpation due to habitat loss or poaching; 3) hunting and exportation of these species is carefully regulated; 4) the number of trophies to be taken each year (6 leopard, 12 goral, and 12 serow) will have no adverse effect on overall populations; and 5) sport hunting is indirectly beneficial to the species by bringing in revenues that can be applied to wildlife conservation. The Department also indicated, however, that it has not carried out extensive studies or surveys on the three species.

If the status of the three animals under the Endangered Species Act is changed to Threatened, special regulations could be published allowing the importation of trophies from Nepal, if it can be demonstrated that such importation would be necessary and advisable for conservation of the species.

The FWS welcomes all interested parties to submit any information, comments, or opinions relevant to these matters. Comments should be addressed to the Associate Director-Federal Assistance (OES), U.S. Fish and Wildlife Service, Washington, D.C. 20240. All responses received by December 11, 1985, will be considered in arriving at a decision on whether or not the FWS should propose a reclassification and import regulations. If such proposals are made, there will be at least an additional 60 days for public comment.

Paiute Cutthroat Trout Recovery Plan

A rare, distinctive member of the cutthroat trout complex, the Paiute cutthroat trout (*Salmo clarki seleniris*) is native to a short section of Silver King Creek (and its accessible tributaries) on the eastern slope of the Sierra Nevada range within Toiyabe National Forest, Alpine County, California. This Threatened fish evolved in isolation from other fishes in this headwater tributary of the Lahontan Basin, and has developed traits that render its prospects for coexisting with potential competitors highly unfavorable.

In the early 1900's, the Paiute cutthroat was eliminated from its presumed historical habitat through introgressive hybridization with another Threatened fish, the Lahontan cutthroat trout (*Salmo clarki henshawi*), and with the introduced rainbow trout (*Salmo gairdneri*), both of which gained access into the Paiute cutthroat's native habitat. Fortunately, before this happened, the range of the Paiute cutthroat was extended into the upper reaches of Silver King Creek and its headwater tributaries by one or more "unofficial" translocations over an impassable barrier, Llewellyn Falls.

Before the main population above Llewellyn Falls itself was contaminated by the introduction of other trout taxa, progeny of the translocated Paiute cutthroat were placed into a number of other creeks and lakes in east-central California. However, most of these fish have failed to produce self-sustaining

populations of Paiute cutthroat trout. Stable, genetically pure populations are known to survive only in three headwater tributaries within the Silver King Creek drainage and three streams outside the native watershed.

Hybridization and competition with other trout taxa probably will always be a threat to the Paiute cutthroat. The installation of fish barriers is of some value, but they can be circumvented by uninformed or unconcerned people seeking to stock their preferred fish species. Because the Paiute cutthroat trout is an extremely unwary fish, the small surviving populations are vulnerable to depletion from angling.

Habitat alteration is another problem. Beavers have been introduced along Silver King Creek and these rodents, which are not native to the area, seriously modify and degrade stream habitat. Beavers are primarily responsible for the 10-fold decline in Paiute cutthroat trout in Four Mile Canyon Creek. Stream siltation may be increased by livestock grazing in two allotments in the Silver King Creek basin. Grazing and trampling in the riparian zone can also result in the loss of instream cover, increases in water temperature, loss of spawning habitat, and reduced food supplies. Development of small hydroelectric facilities is another potential threat; the downstream segments of affected streams could become dry, reducing the available habitat.

Previous Conservation Efforts

Early transplants of the Paiute cutthroat trout into waters outside its known native habitat forestalled the extinction of this fish, although they have not ensured its long-term survival. Past management efforts to protect the species involved primarily 1) mechanical or chemical stream treatments to remove competing or hybridized fish; 2) translocations of Paiute cutthroat to other waters; 3) land exchanges to secure essential habitat; and 4) fishing closures.

Except for one small inholding in the Silver King basin, the major Paiute cutthroat habitats are now publicly owned and are located primarily on lands administered by the U.S. Forest Service (USFS). Personnel with the Toiyabe, Inyo, and Sierra National Forests are cooperating with California Department of Fish and Game representatives to rehabilitate and properly manage these streams for the species' recovery. The success of the recovery program depends on the continuing participation and cooperation of these agencies.

Recovery Actions

The *Paiute Cutthroat Trout Recovery Plan*, approved in January 1985, outlines the steps that should be taken in order to restore this fish to a secure status. Its specific goals are to 1) reestablish a self-sustaining population in the mainstem of Silver King Creek, and 2) secure and maintain the integrity of the habitats in Silver King, Cottonwood, and Stairway Creeks over a 5-year period with stable or increasing overwintering populations of 500 or more adult fish in each drainage.

The first phase of the recovery plan is to secure those populations of the Paiute cutthroat that still survive. Since the small tributary populations within the Silver King Creek basin are the only ones within the fish's native drainage, protecting these fish and their habitats is the highest recovery priority. The existing fish barrier on one of the creek's headwater tributaries may be breached during times of high water flows, and it will have to be reinforced to keep out non-native fishes. Stream reaches along Silver King Creek and its tributaries that contain introgressed fish will need to be treated chemically to remove all fish and then be restocked with genetically pure Paiute cutthroat trout.

Within other streams, electrophoretic studies can be conducted on populations of questionable genetic purity to detect their biochemical characteristics before eliminating them because of hybridization

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Photo by Ed Lorenzen

Native Paiute cutthroat trout habitat at upper Silver King Creek, California

Trout Recovery

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or managing them as Paiute cutthroats. The recovery plan also calls for annual monitoring to document population levels, detect the presence of non-native fishes, and identify suitable but unoccupied habitats. All fish barriers also should be inspected periodically.

Rehabilitation of degraded habitat will be necessary to ensure the success of reintroduction effects. For Paiute cutthroat trout, the most favorable habitat consists of clear streams, clean gravel substrates for spawning, and undercut or overhanging banks with abundant riparian vegetation. Much of the species' historical habitat was damaged when beavers became established in the area. These non-native rodents cut willows and aspen that anchor stream banks. In addition, large amounts of silt are released when old dams collapse. The recovery plan calls for the removal of beavers from the Paiute cutthroat trout's range.

Riparian vegetation could be further conserved by fencing sensitive areas from livestock grazing in order to control erosion. Willow plantings may be needed in some of the more seriously degraded stretches to speed stream bank recovery. Some former habitat could benefit from the placement of anchored logs or other structures in eroded stream channels to restore stream-bank stability, stream channel gradient velocity, natural stream depths, and pool quality.

Because Paiute cutthroat trout are so vulnerable to angling, the recovery plan recommends that fishing in the portions of the Silver King Creek drainage that are targeted for restoration of Paiute cutthroat trout remain closed until the habitats have been rehabilitated and populations are close to carrying capacity. The Paiute cutthroat has always been restricted in range—a total of only 15 km (9.3 miles) of stream habitat within a single watershed—so any fishing closures would not affect large areas.

Kemp's Ridley Turtle Conference

The National Marine Fisheries Service's Southeast Fisheries Center—Galveston Laboratory and Texas A&M University—Mitchell Campus will be co-sponsoring an international symposium on "Kemp's Ridley Sea Turtle Biology, Conservation and Management" during October 1–4, 1985. For information on attending this symposium, contact Charles W. Caillouet (NMFS SEFC Galveston Laboratory, 4700 Avenue U, Galveston, Texas 77550) or Andre M. Landry (Texas A&M University, Department of Marine Biology, Pelican Island, Galveston, Texas 77553).

Eight Species

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Tar River Spiny Mussel

A unique species of freshwater mussel, the Tar River spiny mussel (*Elliptio (Canthyria) steinstansana*), has been listed by the FWS as Endangered (6/27/85). This rare invertebrate is known only from a 12-mile (19-km) stretch of habitat in Edgecombe County, North Carolina, and is thought to number only 100–500 individuals. Although it may have always been uncommon, records indicate that this mussel once had a significantly wider range along the Tar River.

The species' narrow distribution and extremely small population size make it vulnerable to extinction from a single catastrophic event, such as a tanker-truck accident involving a toxic chemical spill. A number of other potential threats to the spiny mussel's survival have been identified. One of these is a proposed hydroelectric project for an existing upstream dam. Depending on project design and operation, this project could impact the species. In addition, the Army Corps of Engineers (COE) has been requested to study the feasibility of modifying the river channel to enhance flood control and navigation, work that could have a severe impact on the mussel. Another Federal agency, the Soil Conservation Service (SCS), alerted the FWS to the possibility of siltation from a project that is designed to remove obstructions in tributaries of the Tar River for the passage of small boats.

The Tar River spiny mussel was proposed for listing as Endangered on September 17, 1984 (see story in BULLETIN Vol. IX No. 10). With approval of the final rule, this mussel now receives full Endangered Species Act protection from taking and the effects of Federal activities. Under Section 7, the Federal Energy Regulatory Commission, which must approve licenses for hydroelectric facilities, will need to consult with the FWS on ways to avoid jeopardizing the mussel if the hydroelectric project proposal is pursued. The COE, in its comments supporting the listing action, requested FWS assistance in evaluating potential impacts of the proposed flood control and navigation project. FWS assistance also will be provided to the SCS for studying any effects of its tributary clearing work.

It is now illegal to collect the spiny mussel without a Federal permit. Because its rarity could make it attractive to collectors, a Critical Habitat designation was judged not to be in the mussel's interests. However, it will still receive the habitat protection described above.

Mancos Milk-vetch

A perennial member of the pea family, the Mancos milk-vetch (*Astragalus*

humillimus) grows in low, tufted mats about 31–45 centimeters (12–18 inches) in diameter. Its compound leaves are composed of many oval, light green leaflets only 0.7–2.0 millimeters (0.02–0.08 inches) in length. The small lavender and white flowers have a sweet, pungent aroma.

A. humillimus is known only from four populations along a ridge west of Waterflow, New Mexico. Approximately 7,000 individuals remain. The largest population, consisting of about 5,000 plants, is scattered over about 21 acres (8.5 hectares), on the Navajo Indian Reservation. It lies within an active oil field, and the entire area is dissected by pipelines and an unorganized assemblage of roads associated with energy development. Although the Navajo Tribe owns the land and surface rights, the leasable mineral rights are privately owned.

Two of the other populations are also on the Navajo Indian Reservation, and one of them, made up of approximately 1,000 plants, is bisected by electrical transmission lines. The land directly beneath the powerline towers was extensively disturbed in 1962–1963 during construction, and *A. humillimus*, which does not tolerate disturbance well, has not repopulated the habitat. A scheduled upgrading of the transmission line will lead to more construction activity along the entire corridor. The Bureau of Land Management (BLM) grants rights-of-way for transmission lines and leases for the development of oil, gas, and other minerals in the area.

Because of the threats to the habitat, the FWS proposed listing *A. humillimus* as an Endangered species on June 28, 1984 (see BULLETIN Vol. IX No. 7). Last month's subsequent final rule (F.R. 6/27/85) gives this plant Endangered Species Act protection. Under Section 9 of the Act, it is illegal to remove and reduce to possession Endangered plants from areas under Federal jurisdiction without a Federal permit. This will apply to all four populations, including the three on the Navajo Indian Reservation (administered through the Bureau of Indian Affairs) as well as the fourth, which is on a BLM site. Both agencies also have responsibilities under Section 7, which protects listed species from adverse effects of Federal activities, and will have to take the presence of the plant into account during their management planning. Section 7 applies even though it was judged imprudent to publicize the species' population sites with a Critical Habitat designation.

Three Gulf Coast Beach Mice

Three beach mice, endemic to the Gulf Coast of southern Alabama and northwestern Florida, have also been given

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Eight Species

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Endangered Species Act protection. A final rule, published in the June 6, 1985, *Federal Register*, classifies the Alabama beach mouse (*Peromyscus polionotus ammobates*), the Perdido Key beach mouse (*P. p. trissyllepsis*), and the Choctawhatchee beach mouse (*P. p. allophrys*) as Endangered.

Beach mice average approximately 5 inches (12.7 cm) in total length and are characterized by small bodies, haired tails, relatively large ears, and protuberant eyes. Their coloration, ranging from pale gray and white to orange- or yellow-brown and white, blends well with the soils and vegetation of their sand dune habitat. The Alabama, Perdido Key, and Choctawhatchee beach mice historically ranged along approximately 166 km (103 mi.) of coastal sand dunes in Baldwin County, Alabama, and Escambia, Okaloosa, Walton, and Bay Counties, Florida. However, based on observations as recent as January 1985, the three beach mice are currently found on approximately 35 km (22 mi.) of the Gulf Coast dunes, a reduction in range to about one-fifth of the original range.

Optimal beach mouse habitat is characterized by high coastal sand dunes, close proximity of forests, sparse cover of ground vegetation with a moderate number of plants, and a relatively low cover of sea oats. These conditions of topography and vegetation provide the necessary food and cover for populations of beach mice and allow attainment of reproductive potential.

Human and natural alterations of the coastal ecosystems have caused the severe decline of beach mice and their habitat. Most of the suitable habitat has been lost because of residential and commercial development, recreational activity, beach erosion, and vegetational succession. Competition for food and cover from introduced house mice (*Mus musculus*) and predation by domestic cats (*Felis catus*) also may be jeopardizing the survival of beach mice, as well as the constant threat of tropical storms, which have already destroyed large areas of habitat for all three subspecies. Tropical storms also cause the mice to drown or force them to concentrate on high scrub dunes where they are exposed to predators.

On June 7, 1984, the FWS proposed to list the Alabama, Perdido Key, and Choctawhatchee beach mice as Endangered along with a formal designation of Critical Habitat. (See story in BULLETIN Vol. IX No. 7.) The proposal generated an unusual amount of interest. During the 4-month comment period following publication of the proposed rule (initial comment period was extended, then re-



Photo by Dr. Julian L. Dusi

Beach mice are characterized by small bodies, haired tails, relatively large ears, and protuberant eyes.

opened for review of two papers), 183 comments were received. A public hearing, held on August 28, 1984, at Gulf State Park Resort in Baldwin County, Alabama, was attended by 180 individuals, 27 of whom made oral statements. Support for the proposal was voiced by 16 environmental organizations, as well as Federal and State agencies, landowners, members of the academic community, and interested citizens. Several Federal agencies, which reacted favorably to the FWS' proposal, indicated that they would experience no economic impacts, that their activities would not impact the beach mice or their Critical Habitat, and that they would ensure protection of the species and their habitat. Several State agencies, also in support of the listing proposal, indicated that they were willing to work with the FWS to protect the beach mice, would consider the species' fragile sand dune habitat in the planning of future projects, and would fully support FWS' recovery efforts. Opposition was received from certain developers and landowners, and attorneys and consultants for development interests.

As part of this final rule, Critical Habitat has been designated for the Alabama, Perdido Key, and Choctawhatchee beach mice to include 53.2 km (33 mi.) of coastline along the Gulf of Mexico in Baldwin County, Alabama, and Escambia, Walton, and Bay Counties, Florida, and is divided into 10 separate parts. The protection of several separate areas of habitat is essential for the conservation of the beach mice. Should a subspecies of beach mouse exist in only one small

stretch of suitable habitat, it would be much more vulnerable to extinction through the effects of tropical storms and other injurious factors.

Of the total Critical Habitat, only 35.1 km (21.8 mi.) is actually now inhabited by the beach mice. A substantial decline of available beach mouse habitat, through destruction or adverse impact by development, has taken place just since data were collected for the June 7, 1984, proposed rule, resulting in a loss of 8.5 km (5.3 mi.) for the 3 subspecies.

There are several activities in the coastal parts of Alabama and Florida that may be affected by the Critical Habitat designation. Federal agencies involved with such activities include the Federal Emergency Management Agency (flood insurance), National Oceanic and Atmospheric Administration (coastal zone management planning), Rural Electrification Administration, and the Environmental Protection Agency. FWS involvement in the Critical Habitat area includes further management and development at the Bon Secour National Wildlife Refuge in Alabama, as well as acquisition of additional land for the refuge. The proposed acquisition boundary includes approximately 6.0 km (3.7 mi.) of Alabama beach mouse habitat, of which 4.3 km (2.7 mi.) already have been purchased by the FWS.

American Alligator in Florida

The American alligator (*Alligator mississippiensis*), a large wetland species
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Eight Species

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of significant commercial and scientific value, occurs in varying densities throughout the southeastern United States, including all or parts of the States of Alabama, Arkansas, Georgia, Florida, Louisiana, Mississippi, Oklahoma, North Carolina, South Carolina, and Texas. First classified as Endangered throughout its range in 1967 due to a concern over poorly regulated harvests, the American alligator recovered rapidly in many parts of its range as a result of Federal and State protection. Subsequently, the FWS was able to reclassify the species to Threatened in all of Florida and in certain coastal areas of South Carolina and Georgia, and Threatened due to Similarity of Appearance in Louisiana and Texas.

Recent data from status assessments conducted by the FWS on the alligator in Florida reflect a biological recovery of the species in that State, which indicates that its current designation as Threatened should be changed. However, because of the alligator's similarity of appearance to other Endangered crocodilians, and because the animal's parts may be subject to trade, the FWS believes that it is necessary to maintain controls on commercial activities involving American alligators in Florida. To help ensure the conserva-

tion of other alligator populations, as well as similar crocodilians, that are currently Threatened or Endangered, the FWS has reclassified the American alligator in Florida to Threatened due to Similarity of Appearance (F.R. 6/20/85).

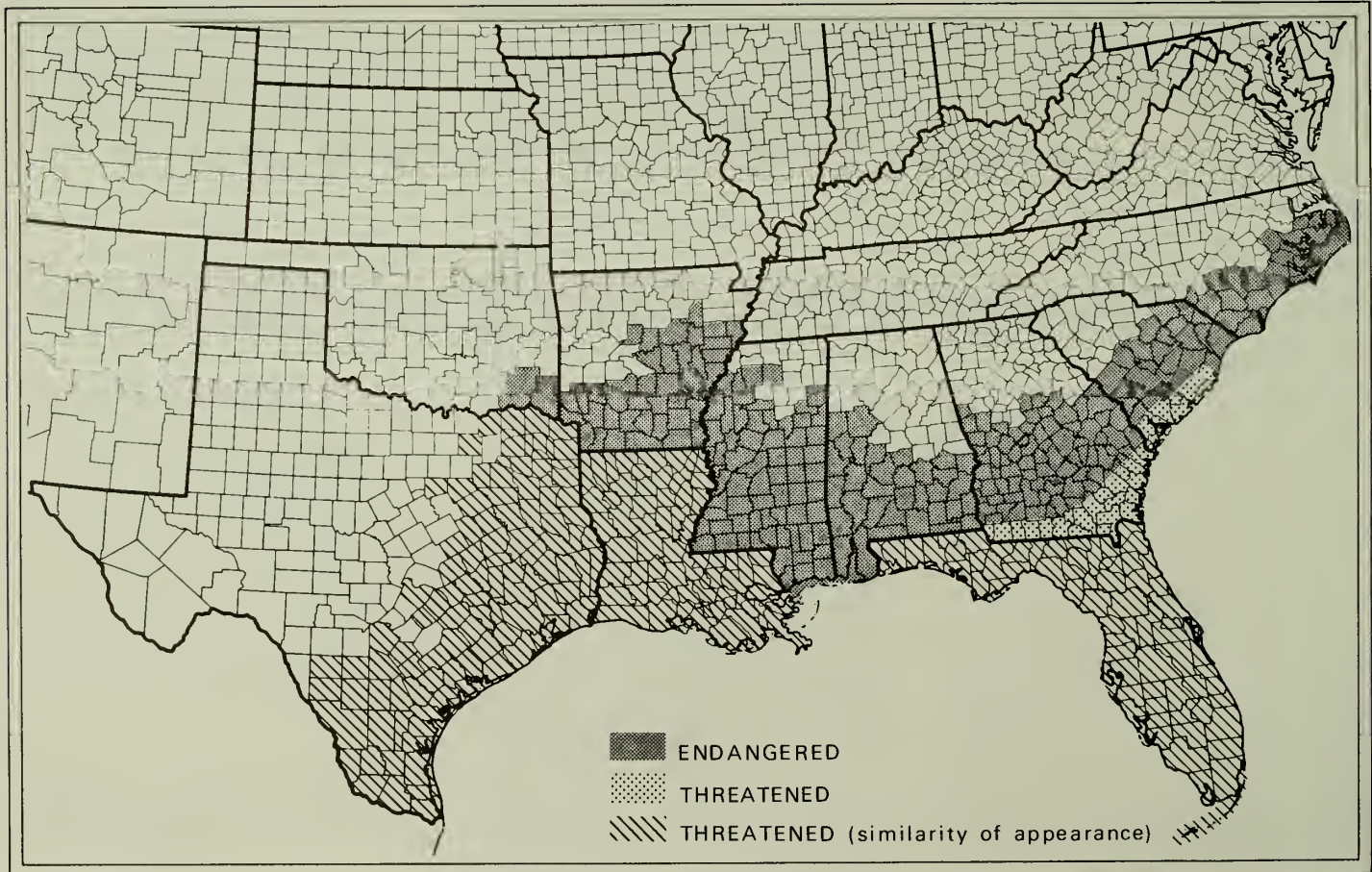
Florida alligators occupy an estimated 6.7 million acres (2.7 million hectares) of habitat. Although some habitat loss is occurring, particularly in southern Florida, this loss will not threaten the species' existence within the foreseeable future. As an added protective measure, additional State habitat acquisition for these animals of key wetland areas in the southern part of Florida has been authorized, and new Federal acquisitions are being considered.

The State of Florida also has adopted an alligator management plan and is conducting an extensive research program designed to ensure against overharvest of the species and to maintain continued healthy alligator populations in the State. Since uncontrolled harvesting was the main threat to alligators in some areas of the State, and sustainable yields from harvested populations are biologically limited, Florida officials are now committed to strictly limited harvests. The only exception to this would be in extremely localized areas where potentially serious conflicts exist between humans and alligators. In this situation, intentional overharvests may occasionally be author-

ized to remove any threat to human safety and promote overall public tolerance of the species.

This final rule, which is authorized under Section 4 of the Endangered Species Act, is a formal recognition by the FWS that the American alligator in Florida is biologically secure in a part of its range. The rule also removes Federal agency responsibilities under Section 7 of the Act and makes available to the State of Florida the option of expanding alligator harvests. If the State elects to expand its harvests, these harvests could be expected to increase at a level commensurate with development and implementation of the State's research and management program. However, all taking and commerce in alligators and their parts and products are to be regulated by the FWS' special rule on American alligators (50 CFR 17.42), as well as all other applicable controls. In addition, by listing this species under the Similarity of Appearance provisions of the Act, the FWS believes that enforcement problems can be minimized while simultaneously ensuring the conservation of listed populations of the American alligator and other crocodilians. These provisions have already proven effective in the State of Louisiana, where various populations of the species have been listed as Threatened by Similarity of Appearance since 1975.

FEDERAL STATUS OF THE AMERICAN ALLIGATOR THROUGHOUT ITS HISTORICAL RANGE



Forest Management—Key to Red-cockaded Woodpecker Survival

by Warren Parker
Endangered Species Field Supervisor
Asheville, North Carolina

Once widely distributed throughout the coastal plains and Piedmont region of the southeastern United States, the Endangered red-cockaded woodpecker (*Picoides borealis*) is a classic example of a

species whose decline is being based solely on habitat loss. It is the only woodpecker that excavates nest cavities in live pine trees, and this trait, in turn, is apparently dependent on the occurrence

of a heart-rot fungus in pines called "red heart." This fungus attacks living heart wood of many southern pines and makes excavation of cavities much easier. The red-cockaded woodpecker exhibits a highly organized social structure, and the birds live in clans of two to six members. Only one pair in each clan nests during a particular year, with the other members of the clan serving as helpers. The female usually lays two to four eggs in the breeding male's roost cavity.

Extensive logging of mature southern pines over the past 75 years has led to the dramatic decline of this species. Best estimates indicate that about 10,000 birds remain in scattered, disjunct populations from Virginia to Texas, mostly on national forest lands and military reservations. Since the birds prefer trees at least 60-years old, with trees 80 to 100 years and older predominating, their fate on private and commercial forest lands is very much in doubt. These lands are being actively managed for harvest on increasingly shorter rotations.

Over the past 8 years, numerous consultations under Section 7 of the Endangered Species Act have been conducted on forest management practices at various national forests and on certain training activities at military bases. Research and survey work on the red-cockaded woodpecker over the past few years has underscored the need for longer rotations, as well as acreage requirements, for foraging habitat. To the credit of the U.S. Forest Service, much of this research and survey work has emanated from their research field stations.

Major military reservations having populations of this woodpecker are now striving to implement approved conservation measures. However, the dilemma facing many of those bases hosting training missions is lack of space. Major new range construction projects, for example, lead to inevitable conflicts with the species, and the Section 7 process goes on and on. On the other side of the coin, a recently completed major Section 7 consultation with the Forest Service has resulted in the incorporation of new research findings on the red-cockaded woodpecker in the Forest Service management handbook. With these firm management guidelines in place and with assurances from Forest Service administrators, it appears that the welfare of the species is promising on these Federal lands.



The red-cockaded woodpecker, boldly marked in black and white, is named for the few red feathers on each side of the male bird's head.

Regional Briefs

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CDFG assessment of significant mortality associated with this method of harvesting bottom fish, the legislation specifically prohibits the use of gill and trammel nets with mesh size greater than 3½ inches within the 15 fathom (150 feet) depth contour between Waddell Creek and Franklin Point in San Mateo County. The Director of the CDFG may allow the use of gill and trammel nets between Point San Luis (San Luis Obispo County) and the Santa Maria River (about 20 miles of coast) for a specified period if it is determined that the use of the nets will not result in any accidental take of sea otters.

The magnitude of this year's cui-ui spawning run up the Truckee River from Pyramid Lake was well below that anticipated. A record run had been forecasted for May because of the size of the April run, adequacy of river flows, and a dominant year-class of sexually-prime spawners. Instead, the run dropped off rapidly after the first week of May. Altogether, Great Basin Complex personnel passed nearly 9,500 cui-ui upstream from the Marble Bluff Fish Facility in 4 weeks. This compared favorably, however, with the first year's run of 11,000 and the 1983 run of 6,000.

Cui-ui larvae began emigrating to the lake during the first week of May with peak movement occurring around May 22. Great Basin personnel estimated that during the peak over 10 million larvae left the river daily. Emigration ended around the first week of June. The excellent production of larvae was probably due to Stampede Reservoir releases that maintain near constant river flows and adequate water temperatures in the lower river during egg incubation and larvae development.

The size of this year's cui-ui run, larvae production, and the number of tag recoveries indicate that there is still much to be learned about the behavior and population dynamics of this fish. These data also indicate that some of the assumptions that helped formulate management strategies and procedures may need reevaluation.

The transfer of juvenile Pahrnagat roundtail chubs (*Gila robusta jordani*) from the Pahrnagat Valley in Nevada to Dexter National Fish Hatchery (NFH) in New Mexico has been completed. Earlier attempts had been unsuccessful in trapping fish for transfer to Dexter in order to establish a captive breeding population as identified in the recovery plan for this species. Success of the entire operation in May 1985 was due to information provided by and cooperation among many individuals and agencies.

The recovery operation was made possible when the Nevada Department of Wildlife was notified that the water supply to an irrigation ditch that possibly contained chubs was no longer being diverted, and the ditch was rapidly drying out. Great Basin Complex personnel and Nevada Department of Wildlife personnel captured 50 juvenile chubs from the ditch using seines and dip nets. The fish were held overnight in a live trap in the stream, then placed in a small amount of stream water in oxygen-filled plastic bags inside styrofoam coolers and driven to Las Vegas. The coolers were immediately flown to Roswell, New Mexico, where they were picked up by Dexter NFH personnel. Forty-six chubs survived the transfer and appear to be doing well in their new home. Future transfers may be required to reduce the possibility of extinction for the single remaining natural population, estimated to be as few as 40 adult individuals.

Region 2—On June 19–20, Region 2 Endangered Species staff members met with individuals of the Southwest Bureau of Indian Affairs area offices and tribal members from three States to assess and coordinate endangered species needs on native American lands, including over 50 Indian reservations. Information was exchanged and further coordination was made that will assist in the recovery of over 25 Threatened and Endangered species occurring on these lands.

Spring 1985 brought nearly a 50-percent increase in bald eagle (*Haliaeetus leucocephalus*) nesting success in the Southwest. Twenty-two chicks fledged from 13 nests located in Arizona.

A bald eagle chick was hatched this spring at the Rio Grande Zoological Park in Albuquerque, New Mexico. Parents of this chick are long-time, adult residents of the zoo and were allowed to raise the chick until it was 8 weeks old. At that time, the chick was sent by air to St. Louis, Missouri, where it was picked up by personnel of the Tennessee Valley Authority and transported to Land-Between-The-Lakes (LBL) at the Kentucky/Tennessee border. Here it was placed in a hack tower along with two wild bald eagle chicks from Wisconsin. All three birds appear to be in excellent health and are scheduled to be released from the tower at 11 to 12 weeks of age. Past hacking efforts at the LBL site have already established one nesting pair.

Six bald eagle chicks (originating from Florida eggs) were hacked at the Sequoyah National Wildlife Refuge (NWR) in eastern Oklahoma. This project is a cooperative effort among the George Miksch Sutton Avian Research Center (GMSARC), the University of Florida at Gainesville, the States of Oklahoma and

Florida, and the FWS. The chicks were 13 weeks old when the door to the hack box was opened. One bird left the area within a day, two left after remaining in the area for 1 week, and at the time of this writing, the remaining two chicks are still on the refuge near the release site, successfully foraging on their own. The sixth fledgling received a leg injury soon after release and is currently being rehabilitated at GMSARC. It is anticipated that this chick will be ready for release again in July. The project is going well and cooperators plan to continue the effort next year. There appears to be no loss of productivity at the Florida nests from which egg clutches were removed.

Of the 28 whooping crane (*Grus americana*) nest sites in Canada's Wood Buffalo National Park, a minimum of 20 chicks have hatched. Several older whooping crane pairs in Canada have produced infertile eggs over the last few years. The cause of the infertility is unknown, but it may be that members of the pairs have exceeded the age of sexual fertility.

During the egg pickup in Canada this year, eggs were candled to check for fertility, and eggs in three nests appeared to contain infertile eggs. All eggs were removed from these three nests and Dr. Ernie Kuyt, Canadian Wildlife Service, substituted one good egg in each of the three nests. The substitute eggs were obtained from nearby whooping crane nests containing two eggs. This egg transfer at Wood Buffalo National Park is the first concerted effort of this kind in Canada and is intended to utilize the experienced but infertile parents to bolster the Wood Buffalo population.

Twenty-three whooping crane eggs were transferred from Canada to Grays Lake NWR in late May. Although three of the eggs were believed to be infertile (see above), they were placed in nests of foster sandhill crane (*Grus canadensis*) parent pairs as a test; however, those eggs did not hatch. There was no nest predation this year, so the remaining 20 eggs hatched. One chick died at the nest site of unknown causes; other losses are unknown.

Water conditions are marginal at Grays Lake and without good spring rainfalls, the potential for chick mortality is greater. Excluding these young birds, approximately 30 whooping cranes presently comprise the Grays Lake/Bosque del Apache whooping crane "flock."

Last year, Dexter NFH spawned Endangered Colorado squawfish (*Ptychocheilus lucius*) in anticipation of their reintroduction into central Arizona streams under the new experimental regulations. Due to delays in the experimen-

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tal listing process, the squawfish could not be stocked last autumn and were held for a stocking effort in 1985.

An estimated 85,000 2- to 3-inch squawfish were placed in the ponds at Dexter NFH last autumn. When those ponds were drained this spring, that number had dropped to 220 4- to 5-inch fish. Colorado squawfish become fish-eating when they grow to about 3 inches, and a significant decline in their numbers due to cannibalism was anticipated, but no one had estimated a 99.75-percent loss. The remaining 220 squawfish were taken into the hatch house at Dexter and supplied with small goldfish as a food source. As of June 18, their numbers had continued to drop and are now down to 80 very healthy fish. It is not unusual to see several 5-inch squawfish swimming around the tanks with 4-inch squawfish tails sticking out of their mouths!

Two thousand Kemp's ridley sea turtle (*Lepidochelys kempii*) eggs were transferred from Playa de Rancho Nuevo, Mexico, to the National Park Service (NPS) at Padre Island National Seashore in Texas. The eggs will be imprinted at Padre Island and then sent to the National Marine Fisheries Service (NMFS) laboratory in Galveston, Texas, for headstarting. This is the eighth year of the 10-year cooperative project conducted by the Gladys Porter Zoo, Mexican Department of Fisheries, Texas Parks and Wildlife Department, NMFS, NPS, and FWS.

Region 4—An 8,700-acre wilderness area on the Kisatchie National Forest, located south of Natchitoches, Louisiana, is the site of a rampant outbreak of Southern pine beetles. These beetles infect trees and often kill them by girdling their cambium layer. Colonies of the Endangered red-cockaded woodpecker (*Picoides borealis*) occur in older timber which seems to be inordinately susceptible to beetle infestations. However, it has also been observed that once beetle populations are well established at a site, they seem to spread even to the newer trees.

Several active red-cockaded woodpecker colony sites have already been lost to the beetles and others are threatened by them. Beetle control in the wilderness area has consisted only of cutting the infested trees, but other more effective options are being considered, such as fell and salvage and fell and chemical spray. Because of the wilderness designation of the area, the U.S. Forest Service (USFS) has not permitted commercial salvage operations to attempt to solve this problem.

Due to a catastrophic drought, many of south Florida's wetlands have dried-up and populations of the Endangered snail kite (*Rostrhamus sociabilis plumbeus*) have abandoned these areas and dispersed across the State. The Loxahatchee NWR in Boynton Beach, Florida, is the clearinghouse for the Snail Kite Sighting Program. This program, initiated during the severe 1981 drought, was set up to collect and evaluate reports of snail kite sightings from the public and other agencies. The sightings assist in monitoring the kite populations and help in identifying the areas into which the snail kite disperses when its preferred wetland habitat becomes too dry to support its main food source, the apple snail. While many kites are unsuccessful in locating alternate feeding areas during droughts and consequently do not survive, many appear in areas where they are not normally found. These marginal areas include urban and agricultural canals, flooded farm fields, or very small marshes.

It appears that the 1985 nesting season has been seriously disrupted by the drought. While some kites may attempt to nest in the marginal areas, reproductive success in those areas is generally low. The 1984 snail kite population was estimated to include 668 individuals, a record high for the last 15 years. However, it is expected that once again the kite population will significantly decline, due to the adverse impacts of this 1985 drought.

Region 5—On June 21, Richard Dyer, Endangered Species biologist with the regional office, and Jack Swedberg from the Massachusetts Department of Fisheries and Wildlife brought eight bald eagles from Canada to Massachusetts that were graciously donated by the Province of Nova Scotia. This donation is part of a long-term effort between the State of Massachusetts, the Province of Nova Scotia, and the FWS to restore the bald eagle as a breeding species in Massachusetts. The Canadian hosts are to be commended for their excellent hospitality and expert assistance.

During the week of June 23, Paul Nickerson, Region 5's Endangered Species Specialist, accompanied a crew from the Pennsylvania Game Commission to La Ronge, Saskatchewan, Canada, where 12 bald eagles were collected (all in one day). These birds were brought back to Pennsylvania for release sometime in August. The cooperation and assistance provided by the Provincial officials there is also to be commended.

A listing proposal package for Jesup's milk-vetch (*Astragalus robbinsii* var. *jesupi*) was recently submitted to the Washington Office for review. This plant has a very limited distribution along the

Connecticut River in New Hampshire and Vermont and is being threatened by potential hydroelectric development.

The New Jersey Department of Environmental Conservation recently signed a limited authority plant Cooperative Agreement with the FWS as authorized by Section 6 of the Endangered Species Act. Funds have been made available through this agreement for activities to aid in the recovery of the small whorled pogonia (*Isotria medeoloides*) in the State of New Jersey.

Region 6—On May 28, 1985, the Bureau of Land Management, FWS, NPS, and USFS jointly published Interagency Guidelines on Management of Grizzly Bears in the *Federal Register* (50 FR 21696). The above agencies, as members of the Interagency Grizzly Bear Committee, are seeking public comments on these guidelines which may affect grizzly bear management in Idaho, Montana, Washington, and Wyoming. These guidelines, formulated in response to direction from the Department of the Interior and the Related Agencies Appropriation Act of 1985, attempt to integrate recreational and utilitarian activities within grizzly bear habitat to the extent that these activities are compatible with the recovery goals of the bear.

Yellowstone National Park is currently exhibiting "Wolves and Humans: Coexistence, Competition, and Conflict," an exhibit focusing on human attitudes about wolves. It opened on June 15, 1985, at the Grant Village visitor facility and will run until September 2, 1985. "Wolves and Humans" is a traveling interpretive exhibit created by the Science Museum of Minnesota which explores scientific and humanistic perspectives to show the complex relationships between wolves and humans. From 1985 to 1988, the exhibit will be on tour at some of this country's most renowned museums, including the Museum of Natural History in New York; the National Geographic Museum in Washington, D.C.; and the Science Museum of Boston.

Opening symposia were held in connection with the exhibit in Cody and Jackson, Wyoming, on May 31 and June 1, respectively. The symposia presented information on the historical and contemporary range of attitudes, values, and opinions held about wolves. Support for the exhibit and opening symposia was provided by grants from the National Endowment for Humanities, Wyoming Council for the Humanities, Defenders of Wildlife, and the FWS.

On June 12, 1985, the Colorado River Coordinating Committee steering sub-

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Recovery Plan Update

On June 27, 1985, a recovery plan for the Santa Barbara Island live-forever, an Endangered California plant, was approved. Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

Regional Briefs

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group met to develop a draft task group work plan. This plan will be used to direct a coordinated interagency approach to resolving controversy between water developers/users, the needs of Endangered fish, and Endangered Species Act requirements. The draft work plan outlines the committee's tasks to review recovery objectives, to evaluate means of implementation, to develop recommended implementation, and to define the relationship between recovery and Section 7.

Region 7—Family groups of wild Aleutian Canada geese (*Branta canadensis leucopareia*) have been transplanted to Agattu from Buldir Island since 1980, and it appears that this effort has succeeded in reestablishing a breeding population there. Alaska Maritime NWR personnel have recently confirmed that at least 12 pairs of Aleutian geese are nesting on Agattu Island this year, with as many as 60 birds observed in flight.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	23	19	234	4	0	22	302	23
Birds	60	13	144	3	1	0	221	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	31	4	11	18	3	0	67	37
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	18
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	9
Plants	72	5	1	19	2	2	101	42
TOTAL	236	47	461	66	10	37	857	213**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 179

Number of species currently proposed for listing: 25 animals
32 plants

Number of Species with Critical Habitats determined: 84

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

June 30, 1985

In anticipation of arctic fox (*Alopex lagopus*) eradication work on Kiska Island, FWS biologists are undertaking a comprehensive survey of the breeding birds and marine mammals of this remote, 69,500-acre island. This information will be extremely valuable in future years if fox removal efforts succeed and native bird species (including Aleutian geese) recolonize the island.

In interior Alaska and along the north slope of the Brooks Range, Endangered Species biologists, FWS contractors, and Bureau of Land Management cooperators

are conducting surveys for nesting peregrine falcons (*Falco peregrinus*) and are banding young. Recently completed work on the Arctic NWR revealed that only 2 of about 15 historic peregrine nest sites are currently occupied. Recovery of peregrine populations in most other regions within Alaska is more encouraging.

Refuge botanists Steve Talbot and Nancy Felix are conducting field work to assess the status of candidate plants on the Aleutian Islands NWR and Arctic NWR, respectively.

July 1985

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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Technical Bulletin

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Endangered Classification Proposed for Four Plants

Four species of plants were proposed by the Fish and Wildlife Service (FWS) on July 16, 1985, for listing as Endangered species (see details in *Federal Register*). Three of them occur in the Hawaiian Islands, where their habitat faces threats from grazing, urban and agricultural development, and certain other land uses. Similar problems are being encountered by the fourth species, which occurs in parts of central California.

Three Hawaiian Plants

Scaevola coriacea (dwarf *naupaka*) is a sparsely branched, prostrate shrub. An individual plant can sprawl over an area up to 108 square feet (10 square meters) in size, with most of its vegetation at or near ground level. Found only near the ocean, *S. coriacea* grows on low, consolidated sand dunes.

Historically, populations of *S. coriacea* occurred on all of the major Hawaiian Islands, with Maui probably supporting the highest numbers. Currently, however, only four small populations of the species survive, all on Maui and two nearby islets. A total of only about 350 plants remain in their natural habitat, and 300 of them are concentrated on four sand dunes at Waiehu Point. Part of this site is on the periphery of county land used as a golf



Photo by Derral Herbst

The cream-colored flower of *Scaevola coriacea* has a corolla split down the upper side so that it resembles half of a radially symmetrical flower.

course, but about two-thirds is privately owned property scheduled for development in the near future. Loss of this habitat would have a significant impact on the species' chances for survival. Fortunately,

S. coriacea has a degree of protection on the islets, which are designated as State bird sanctuaries; a permit is needed to land on them.

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Listings Become Final for Two Animals and Seven Plants

During July 1985, final rules were published in the *Federal Register* recognizing the precarious status of the following two animals and seven plants, and placing them under the protection of the Endangered Species Act:

Flying Squirrels

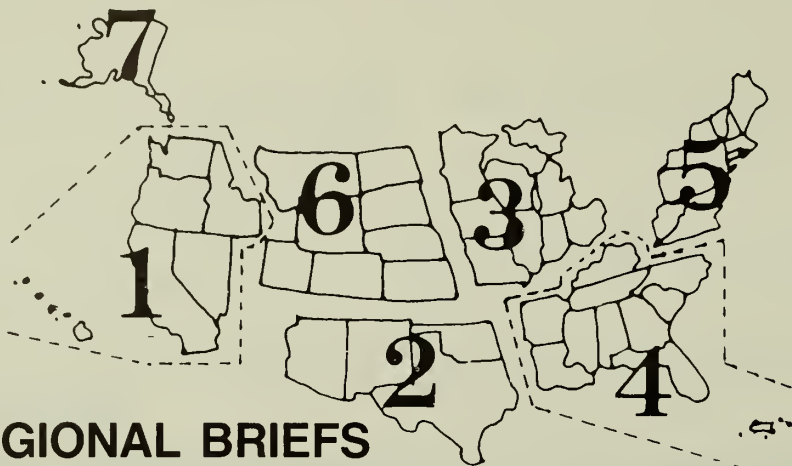
Glaucomys sabrinus fuscus and *Glaucomys sabrinus coloratus*, two subspecies of the northern flying squirrel, were proposed for listing as Endangered on November 21, 1984. (See feature story in BULLETIN Vol. IX No. 12.) Al-

though never common, both subspecies have declined considerably over recent decades. A few survive in relictual habitat on a few high peaks in the southern Appalachian Mountains. Their remaining habitat faces continuing pressure from logging and recreational development (e.g., ski resorts). The animals themselves are threatened by the spread of the more common and adaptable southern flying squirrel (*Glaucomys volans*), a competing species that also carries a parasitic nematode lethal to *G. sabrinus*.

The rule listing *G. s. fuscus* and *G. s. coloratus* became final on July 1, 1985.

Because flying squirrels in general are popular as pets, the Fish and Wildlife Service (FWS) believes it would be imprudent to publicize the locations of the last individuals with a designation of Critical Habitat; however, all habitat conservation provisions of the Act will apply. The remaining sites that may be occupied are in Virginia, West Virginia, North Carolina, and Tennessee, some of them on National Forest land. The U.S. Forest Service may be required to consult with the FWS on future actions such as timber sales, spraying of insecticides, or estab-

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REGIONAL BRIEFS

Endangered Species Program regional staffers have reported the following activities for the month of July:

Region 1—The Sacramento Endangered Species Office (SESO) staff recently applied a foliar fertilizer to the two remaining Endangered Truckee barberry

(*Mahonia* (= *Berberis*) *sonnei*) plants. It is hoped that this action will enhance the vigor of the remaining barberries and improve the chance for successful vegetative propagation of the species by a nursery contractor, Cornflower Farms. The overall poor condition of the plants and

their habitat, the ongoing construction of homes along the Truckee River, and other urban-associated disturbances (i.e., trash dumping, gardening) have increased the need for propagating and eventually outplanting barberries in protected suitable habitat.

The SESO staff met with representatives of the Hayward Area Recreation District and California Department of Fish and Game to discuss compensation ideas for a proposed nature interpretive center that would eliminate approximately 5 acres of Endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) habitat. An agreement was reached to enhance and create habitat on adjoining property by constructing small "islands" and other topographic relief that would improve habitat diversity and high tide escape cover. Installation of tide gates to enhance pickleweed and shorebird values was also agreed upon.

The captive breeding program for the Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*) now has 17 animals, including one adult male captured in May from the Buckskin, California, area. Prior to this capture, no adult males had been trapped. The only males available were those born in captivity (4) and one runt male that was captured in 1984. Consequently, no breeding has yet been attempted. It is expected that, with the adult male now available, some breeding may begin this summer when females begin estrus. Captive born males should be in breeding condition by late summer.

Six bald eagle (*Haliaeetus leucocephalus*) nestlings were removed from nests in northern California and transported to Santa Catalina Island for release. Unfortunately, one of the nestlings died during transport. The remaining birds are doing fine and will be released soon from hack sites.

Smith's blue butterflies (*Euphilotes enoptes smithi*) were recently collected from the Lone Star Olympia Quarry (Santa Cruz County) during a follow-up survey of this site conducted by Larry Seeman Associates. The survey was undertaken in response to SESO comments on a 1984 survey report concluding that Smith's blue butterflies were not present on this property. The 1985 collections were made from the part of the quarry that is next in line for surface disturbance and sand mining operations.

During June 1985, five individuals of the Threatened southern sea otter (*Enhydra lutris nereis*) were found dead, and one died shortly after it was found in a semi-comatose condition suffering from a collapsed lung and face and foot

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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Regional Briefs

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wounds. Three of the otters found were shot, another drowned in a commercial fishing net, and one died of gastrointestinal tract ulcerations and infections.

To date, a total of 22 dead otters were found in 1985. Five of them were shot this year, three just in the month of June. Last year by the end of June, 87 otters had been reported dead.

From May 31 to June 2, 1985, a group of volunteers from Catlin Gabel High School in Portland, Oregon, hand-weeded cheatgrass from an 8-acre area on which there were previously known concentrations of the Endangered Malheur wire-lettuce (*Stephanomeria malheurenensis*). Cheatgrass, an introduced species, is thought to be competing with this plant and possibly threatening its existence. The weeding effort was coordinated through a Bureau of Land Management (BLM) botanist from the Burns District.

For the first time in 13 years, peregrine falcons (*Falco peregrinus*) have established an eyrie in Idaho and hatched two young. Both adults were produced and hatched out by The Peregrine Fund. Cooperation among the U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (USFS), BLM, Idaho Department of Fish and Game, and the Simplot Corporation made this landmark event possible.

The Peregrine Fund-West, located in Boise, Idaho, has had the most successful year ever in producing peregrine falcons for restocking in the Rocky Mountains. Last year, 131 peregrines were produced at the Ft. Collins, Colorado, facility. After moving to new breeding barns in Boise, Idaho, 162 peregrine falcons were produced in 1985. Dr. Bill Burnham, Director of the Rocky Mountain Program, expects a total of 150 of these birds to be hatched out or placed in active nests this summer.

FWS field station personnel in Reno, Nevada, estimated that approximately 50 million cui-ui (*Chasmistes cujus*) larvae

were recruited to Pyramid Lake. Cui-ui larval emigration, which peaked about May 24, was completed by June 7. Three hundred adults from Marble Bluff Fish Facility were transported to the Pyramid Lake Indian Tribal Enterprises cui-ui hatchery where 9 million eggs were taken. Most offspring from these eggs were released as larvae, with approximately 1 million being held for extended rearing to yearling size.

Experiments to evaluate the effects of the 12-meter high Marble Bluff Dam on cui-ui larval emigration have been completed. Three groups of hatchery-reared larvae were released at the top of the dam, then recaptured just below the dam. The recaptured larvae were held in an aquarium for 48 hours, after which live and dead larvae were counted. Mortality associated with the dam ranged from 9 to 13 percent.

Construction work was done on a channel adding 400 feet of stream habitat to the Moapa National Wildlife Refuge (continued on page 6)

Proposed Threatened Classification for Dismal Swamp Shrew

The Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*) is a small, long-tailed mammal with a brown back, slightly paler underparts, buffy feet, and a relatively short, broad nose. This shrew is restricted to the Great Dismal Swamp National Wildlife Refuge (NWR) and adjacent portions of the swamp in southeastern Virginia and in North Carolina. It is found in a variety of habitats ranging from lowland old fields to mature pine and deciduous forest areas, but the subspecies is most abundant in mesic successional habitats, such as cane stands, regenerating clearcuts, and 10- to 15-year old forested plots.

S. l. fisheri is now in danger of extinction due to its very limited distribution and to recent human-induced habitat changes in the swamp. In addition to causing direct adverse effects on the shrew, these changes may be allowing a neighboring upland subspecies of southeastern shrew, *Sorex longirostris longirostris*, to invade the swamp. Because of the threats to the Dismal Swamp southeastern shrew's survival from habitat changes and hybridization with *S. l. longirostris*, the Fish and Wildlife Service (FWS) has proposed to list *S. l. fisheri* as Threatened (F.R. 7/16/85).

Around the turn of the century, the Dismal Swamp covered approximately 2,000 square miles (5,181 square kilometers), and even then, its size had been reduced by clearing and draining for agriculture. Today, only about 328 square miles (850 square kilometers) of the original swamp

remain intact, a reduction in size of close to 85 percent. Ditching has lowered the water table within the remaining swamp, and other activities, such as burning, grazing, and logging, which once maintained portions of the swamp in various stages of succession, were curtailed or eliminated when the Great Dismal Swamp NWR was established in 1973. As a consequence, the former heterogeneous blend of large tracts of bald cypress, Atlantic white cedar, and cane has been replaced by a more homogeneous, mesic swamp dominated by a rapidly maturing red maple and black gum forest. This progression toward homogeneous, mature forests had very likely been detrimental to the Dismal Swamp southeastern shrew. Of all habitat types evaluated in the swamp, densities of the genus *Sorex* were lowest in mature forests. The habitat types where the shrew is most abundant are now rare within the swamp and will essentially disappear if present trends continue.

In addition, it is probable that the continued interbreeding of the two subspecies, *S. l. fisheri* and *S. l. longirostris*, will eventually result in the loss of the Dismal Swamp southeastern shrew as a taxonomically distinct subspecies. This hybridization process is the primary threat to *S. l. fisheri*, and is comparable to that which nearly destroyed another Endangered mammal, the red wolf (*Canis rufus*).

The FWS has determined that a formal designation of Critical Habitat is not prudent for this subspecies. Nearly all of its

known habitat lies within the Great Dismal Swamp NWR, and refuge managers are already aware of the shrew's occupied range and the importance of protecting it. In addition, if the Dismal Swamp southeastern shrew is listed as Threatened, this action would be followed by continued development of refuge management strategies that will be designed to benefit the subspecies. Thus, no direct benefits would accrue from a Critical Habitat designation at this time.

If the proposal to list *S. l. fisheri* is approved, it will receive protection through the Endangered Species Act. Conservation measures provided to species listed under the Act include controls on taking, possessing, and interstate or international trafficking without a permit. The FWS would also be required to develop and implement a recovery plan for the species.

Under Section 7 of the Act, Federal agencies would be required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species. An overall management plan is currently being developed for the Great Dismal Swamp NWR and it is being designed, in part, to consider the needs of *S. l. fisheri*.

Comments on this proposed listing are invited and should be sent to the Endangered Species Field Office, U.S. Fish and Wildlife Service, 1825 Virginia Street, Annapolis, Maryland 21401, by September 16, 1985.

Four Plants

(continued from page 1)

Only 10 individuals of *Hibiscadelphus distans*, or the Kaua'i hau kuahiwi, are known to exist. This rare tree occurs at one site within the Pu'u Ka Pele Forest Reserve at Waimea Canyon, Island of Kaua'i. Although it likely was once more abundant and widely distributed, the current range of *H. distans* totals about 2,000 square feet (0.018 hectares) on a single rock bluff.

The habitat of *H. distans* is subject to disturbance from several sources, the most serious of which is the presence of feral goats. Large herds of these non-native animals are being maintained within Waimea Canyon as game for hunting. Their browsing has destroyed much of the area's native vegetation, increasing erosion and favoring the spread of competing exotic plants. Although goats are not known to browse on *H. distans* at this time, they are probably responsible for the species' original decline and they could destroy the remaining trees in the future. Another threat to the habitat comes from hikers; a trail passes below the ledge where *H. distans* is found, and hikers straying off the path can erode the fragile soil. The presence of a trailside shelter with a fire pot near the lone population adds the potential threat of destruction by fire during the area's dry season.

Abutilon menziesii, a shrub also known as ko'olua 'ula, formerly occurred on the Islands of Hawai'i, Maui, and Lana'i. Due to the effects of grazing, erosion, and the conversion of habitat to cropland, however, *A. menziesii* has declined dramatically in both numbers and range. It is now extirpated on Hawai'i, and only two small remnant colonies are known on Maui. The principal remaining population is on Lana'i, where the former sites have been reduced in number from

six to one. (A single plant on O'ahu is probably an escape from cultivation.) Almost all of the plants occur on privately owned lands.

Much of the habitat where *A. menziesii* once grew was cleared for use in cultivation (pineapple and sugar cane) and pastures, lands that often were abandoned in later years. A continuing threat to the species' habitat is erosion, which is being aggravated by overgrazing. Introduced animals are not only damaging the soils where the last *A. menziesii* individuals are found, but they are consuming the species directly. Browsing by cattle has been the major problem, and evidently is responsible for the disappearance of *A. menziesii* from the Island of Hawai'i, while axis deer and feral goats pose the major threat to the species on Lana'i. An introduced herbivore of another kind, the Chinese rose beetle (*Adoretus sinicus*), also has been documented to defoliate the plants.

The FWS believes it would be imprudent to propose designations of Critical Habitat for the three Hawaiian plants because publicizing the locations of these extremely rare species could make them more vulnerable to vandalism or illegal collecting. Nevertheless, if the listing proposals become final, all three plants will receive protection under Section 7 of the Endangered Species Act from any adverse effects of Federal actions.

Other benefits of a listing would include the possibility of Federal aid to State conservation programs for the species, the requirement for the FWS to develop and implement recovery programs, and a prohibition on interstate or international trafficking in listed species without a permit. Further, if the three plants are placed on the Federal list, they will automatically receive State protection under Hawai'i's own endangered species legislation, which prohibits take and encourages conservation efforts by State agencies.

Cordylanthus palmatus

A rare plant native to central California, *Cordylanthus palmatus* (palmate-bracted bird's-beak) is an annual herb in the snapdragon family. Like other members of the genus and related genera in the family, *C. palmatus* is hemiparasitic on the roots of various seed plants. It grows from 4 to 12 inches (10.0 to 30.5 centimeter) tall and has grayish-green stems and leaves. The small, pale white flowers, 0.5 to 1.0 inches (1.3 to 2.5 cm) long, are arranged in dense spikes, and each flower is surrounded by a small lobed floral bract.

Little is known about the species' ecology aside from its occurrence in, and possible confinement to, a saline-alkali soil type of limited distribution on central California's lowland flats and plains. Over the years, specimens of *C. palmatus* have been collected from eight sites in six California counties. Only two of these locations, and one site where a transplanted colony was established, still support the species. Its range was reduced as a result of the conversion of land for agricultural uses, intensive livestock grazing, urban development, and other activities that damaged the habitat and altered native plant communities inhabited by *C. palmatus*. The State of California already considers *C. palmatus* to be endangered, but State law does not provide for adequate habitat conservation.

The largest surviving population of *C. palmatus* is near the city of Livermore in Alameda County. From 2,000 to 5,000 plants are scattered over about 180 to 200 acres (73 to 81 ha) of privately owned land that is scheduled for residential and/or agricultural development. In January 1983, about 20 percent of the area was bulldozed and a portion of the associated wetlands illegally filled. A much smaller population occurs near Woodland in Yolo County. Originally, the Woodland colony occupied approximately 10 acres (4.0 ha), but about 8 acres (3.2 ha) were plowed under in recent years. Now only 100 to 200 plants remain, all growing on City of Woodland property along a drainage ditch and in an open field that is being considered for development of a sewage treatment facility.

At the transplant site, located on the Mendota State Wildlife Management Area in Fresno County, so few individuals are present that any disturbance of the habitat could extirpate the entire colony. In 1983, only 20 to 30 plants were seen. Damage from off-road vehicles has been a serious problem at the Mendota site in the past, but the current refuge manager is aware of the problem and is attempting to protect the habitat.

If the proposal to list *C. palmatus* under the Federal Endangered Species Act is made final, this plant and its habitat will receive protection from any adverse ef-

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Hibiscadelphus distans has green heart-shaped leaves and small greenish-yellow flowers that turn dark red with age.

Four Plants

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fects of Federal activities even though the FWS deemed it imprudent to officially designate Critical Habitat. Currently, the FWS is not aware of any Federal activities that may affect the species; however, the U.S. Army Corps of Engineers has permit jurisdiction over some wetlands where the species occurs, and any developments proposed for these areas may be subject to the Federal agency consultation requirements of the Endangered Species Act.

Final Listings

(continued from page 1)

ishment of recreational facilities to ensure that they do not jeopardize the squirrels; however, no such specific actions in the subspecies' range are anticipated.

Ruth's Golden Aster

Ruth's golden aster (*Pityopsis ruthii*) is a fibrous-rooted perennial with very short stems and long narrow leaves covered with silvery hairs. Its yellow flower heads appear in late August and September, and fruits develop within a few weeks after the flowers fade. Named for Albert Ruth, a Knoxville, Tennessee, botanist, *Pityopsis ruthii* is known to occur only along short reaches of the Ocoee and Hiwassee Rivers in Polk County, Tennessee. The two known remaining populations of this species are in danger of extinction due to severe threats caused by water quality degradation, toxic chemical spills, and water level and flow regime alterations. Recreational use of the Hiwassee and Ocoee Rivers may also pose a threat to the aster's existence, if current levels of activity should increase in the future.

On November 20, 1984, the FWS published a proposal in the *Federal Register* to list Ruth's golden aster as an Endangered species (see story in BULLETIN Vol. IX No. 12). All comments received were in favor of an Endangered Species Act listing. After a thorough review of all available information, the Service published the final rule (F.R. 7/18/85). In addition to the protection given to this species by the Endangered Species Act, the State of Tennessee recently passed the Tennessee Rare Plant Protection Act of 1985, which will also provide protection for *P. ruthii* once rules and regulations are developed.

The U.S. Forest Service and the Tennessee Valley Authority have jurisdiction over both populations of *Pityopsis ruthii*, which occur in the Cherokee National Forest. There are currently Federal activities under way or in the planning stages that could have an impact on this

Other benefits of a Federal listing would include the requirement for the FWS to develop and implement a recovery program for *C. palmatus*, the possibility of Federal aid to State conservation programs, and the prohibitions on interstate or international trafficking in the species without a permit.

Comments on the proposals to list any of the four plants are welcome from all interested agencies, organizations, and individuals, and should be sent to the Regional Director, Region 1 (address on page 2 of the BULLETIN) by September 16, 1985.

species' survival, including management of flow regimes and water levels on the Ocoee and Hiwassee Rivers, timber harvesting, road and bridge construction, and recreational development. Both Federal agencies, however, are aware of the exact locations of *P. ruthii* and the importance of protecting it.

Miccosukee Gooseberry

Known from only two locations, the Miccosukee gooseberry (*Ribes echinellum*) is a unique shrub that reaches one meter (3.3 feet) tall and forms patches that often measure several meters in diameter. This plant has spiny stems with three-lobed leaves, small, greenish-white flowers, and spiny, round fruits. First discovered in 1924 along the shore of Lake Miccosukee in Jefferson County, Florida, *R. echinellum* was known only from this population for over 30 years, until a second population was located in 1957 in McCormick County, South Carolina. In 1984, an additional segment of the Florida population was discovered approximately 0.6 kilometers (1 mile) from the previously known plants. Populations in both States are threatened by potential recreational activities. The Florida plants are threatened also by development pressures and logging of their lakeshore habitat, while the South Carolina population is further threatened by competition from an introduced vine, Japanese honeysuckle (*Lonicera japonica*).

The South Carolina population occurs on land managed as a nature preserve by the South Carolina Wildlife and Marine Resources Department, and the risk to this population from accidental trampling or other destruction could become greater if public visitation to the area increases. In Florida, the population is on privately owned lands and has a high potential for lakeside development. Logging has occurred near part of this site and has already caused some detrimental effects to the plants. The threats posed by such activities prompted the Service to propose a listing as Threatened on August 31, 1984 (see BULLETIN Vol. IX No. 9), and sub-

sequently to publish the final rule (F.R. 7/18/85).

The Miccosukee gooseberry is afforded limited protection under Florida State law, which includes prohibitions concerning taking, transport, and sale of plants listed under the law, but does not directly protect the habitat. South Carolina does not have any State laws to protect threatened and endangered plants, but *R. echinellum* is indirectly protected against unauthorized taking under the natural area prohibitions that are enforced at the nature preserve. The Endangered Species Act will now offer additional protection for the plant and its habitat.

Florida Rockland Plants

In a final rule published in the July 18, 1985, *Federal Register*, five Florida pine rockland plants were added to the List of Endangered and Threatened Plants. Their survival is threatened by habitat destruction. These plants, located in Dade and Monroe Counties, have been extirpated throughout most of their historic range as a result of the continuing residential and commercial development that has been occurring in the pinelands at an accelerating rate since 1930. Four of these plants, *Euphorbia deltoidea* ssp. *deltoidea* (spurge), *Galactia smallii* (Small's milkpea), *Polygala smallii* (tiny polygala), and *Amorpha crenulata* (crenulate lead-plant) were listed as Endangered. *Euphorbia garberi*, commonly known as Garber's spurge, was listed as a Threatened species.

Pine rockland plants formerly were widely distributed along the south Florida limestone ridge, an area about 105 kilometers (65 miles) long extending from southeastern Broward County to Long Pine Key in Everglades National Park. The ridge reaches 3–5 meters (10–16 feet) in elevation and provides a markedly different habitat for plants and animals than the marshes and wet prairies that dominate the surrounding areas. It is estimated that close to 98 percent of the Dade County pinelands, exclusive of Everglades National Park, have been destroyed by development.

Two of these five Florida rockland plants may be affected by Federal activities. *Euphorbia deltoidea* ssp. *deltoidea* occurs on lands under the jurisdiction of the U.S. Army, and the Army has conferred with the FWS regarding the development of Army Reserve facilities on the site. *Euphorbia garberi* occurs in Everglades National Park, where park management includes prescribed burning of pinelands in areas where the species is located. This habitat management technique is aimed at maintaining the pinelands by preventing vegetational succession, and current burning schedules should benefit the species. No monitoring of *E. garberi* has been done in the

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Final Listings

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past, but this final listing rule will focus increased attention on its status to help prevent any detrimental effects from the fires.

* * *

Effects of the Listings

Under the Endangered and Threatened classifications, all nine species will now receive the protection authorized under

the Endangered Species Act. Among the conservation measures provided to listed species are recognition of their precarious status, recovery actions, possible Federal funding, and prohibitions against certain practices. For the flying squirrels, prohibitions against take without a permit are now in effect. Under the Act, however, the rules for listed plants are different. It is unlawful to remove Endangered plants from only those lands that are under Federal jurisdiction. This protection, authorized by Section 9 of the Act, will be extended to Threatened plants once implementing regulations are completed.

In addition, interstate and international trafficking in these species without a permit is prohibited. For *Euphorbia garberi*, which is listed as Threatened, properly documented seeds of cultivated specimens are exempt from this prohibition. Section 7 of the Act requires Federal agencies to consult with the FWS to ensure that any actions they fund, authorize, or carry out will not jeopardize the survival of any listed species or adversely affect its habitat. Although a formal designation of Critical Habitat was not part of any of these final listing rules, Section 7 regulations will still apply.

Notices of Review

During July 1985, the Fish and Wildlife Service (FWS) published three notices of review in the *Federal Register*. The first two initiated reviews on the status of animals that are candidates for future listing, and the third solicited information on the status of some animals and plants that already are listed as Endangered or Threatened.

1. On July 5, the FWS announced a review on the Samoan fruit bat (*Pteropus samoensis samoensis*), a large bat that may be threatened by habitat modification and hunting for human consumption. In the same notice, the FWS asked for data on the status of the Caribbean coot (*Fulica caribaea*) and the

West Indian ruddy duck (*Oxyura jamaicensis jamaicensis*), two birds thought to be jeopardized by habitat loss and introduced animals.

2. On July 18, the FWS published a review on six cave-adapted invertebrates: *Microcreagris texana*, *Leptoneta myopica*, *Texella reddelli*, *Rhadine persephone*, *Texamaurops reddelli*, and an undescribed species of *Cylindropsis*. These animals are known from a limited group of caves in Travis and Williamson Counties, Texas, that are in or near an area proposed for development.

Information on the status of the species in either of the above notices, and comments on whether or not they should be listed, may be submitted until further notice, and should be addressed to the As-

sociate Director-Federal Assistance (OES), U.S. Fish and Wildlife Service, Washington, D.C. 20240.

3. On July 22, the FWS published a notice on species that were listed prior to 1976 and those that were listed in 1979-1980. Under the Endangered Species Act, the FWS is required to conduct a review of all animals and plants listed as Endangered or Threatened at least every 5 years to determine whether their classifications are still appropriate. A table of those species now under review is printed in the *Federal Register* notice. To be considered during this review, comments must be received by November 19, 1985. The various addresses to which they should be sent also are printed in the July 22 notice.

Regional Briefs

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(NWR). The habitat is being created to increase the refuge's carrying capacity for the Endangered Moapa dace (*Moapa coriacea*). The channel was excavated and partially lined with cement and cobble in June. When lining is completed, substrate will be added to the 2.5- to 5-foot deep and 9- to 14-foot wide channel, and a riparian corridor will be planted.

Region 2—A total of 1,000 Endangered Gila topminnows (*Poeciliopsis occidentalis*) were stocked in five sites on BLM lands in Arizona. This project is a cooperative effort among the BLM, Arizona Game and Fish Department, and FWS to reestablish the Gila topminnow, which was once the most plentiful fish in Arizona.

Dexter National Fish Hatchery personnel recently seined for razorback suckers (*Xyrauchen texanus*) in Carrizo and Cedar Creeks on the Fort Apache Indian Reservation in Arizona, where the fish had been reintroduced in April as small fry. These fry had since grown to 3-4 inches long, and were the first evidence of reintroduced razorback suckers surviving in the wild.

The final report of bald eagle nesting success in Arizona indicates that of 20 known nesting territories, 18 nests were occupied, 17 nests were active, and 13 nests fledged 22 young (7 young higher than in any previous year). Also, two additional nests were discovered this year. One, on the Gila River, is believed to be a new nest and contained two unhatched eggs. The second nest was discovered on the Big Sandy River in west-central Arizona. This nest, believed to be 1-2 years old, fledged two young.

The FWS officially took possession of the Buenos Aires Ranch as a National Wildlife Refuge on August 1, 1985. Reintroductions of masked bobwhite chicks (*Colinus virginianus ridgwayi*) will begin in mid-August and continue into early October. Recent unconfirmed reports indicate that there may be wild masked bobwhites surviving on the refuge as a result of reintroduction attempts made by the FWS in the mid-1970's. It is not yet known how many of these wild birds may be there.

Seven peregrine falcon eyries have been identified in Big Bend National Park as part of a cooperative study funded by the National Park Service, Texas Parks and Wildlife Department, and the FWS. Ten young peregrines fledged from six

sites, the best ever reported for this species in the park. This year's production was up from three young fledged in 1984, and one young fledged in 1983. As part of this study, peregrine falcon eggshell fragments were collected to determine the level of eggshell thinning. Examination of the fragments revealed that thinning was at 15 percent, the level at which reproduction is negatively affected. DDT contamination is the suspected cause of this thinning.

There has been a severe drop in the number of least terns (*Sterna antillarum*) of the listed interior population found on the Bitter Lake NWR in New Mexico this year. This species was listed as Endangered in May 1985 (see BULLETIN Vol. X No. 6). In previous years, up to 15 adult birds had been observed on the refuge, but this year, only two adults have been observed and only four pairs fledged young in 1984. The FWS has not yet discovered the reason for the sharp decline.

Region 4—A dramatic increase in nuisance alligator complaints in eastern North Carolina has been noted recently. Practically all of the complaints are originating in the Wilmington vicinity near lower Cape Fear River. The FWS has a contract with an expert alligator trapper to

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assist the North Carolina Wildlife Resources Commission in capturing and relocating large nuisance alligators. The reasons for the increase in alligator-human contacts is not readily apparent, but continued expansion of residential and second-home construction in once prime alligator habitat is considered to be a primary cause.

The first recorded brown pelican (*Pelecanus occidentalis*) nesting in Alabama occurred in 1983 on Gaillard Island, a man-made island created 4 years ago by the U.S. Army Corps of Engineers to contain dredged material from an adjacent ship channel. This initial nesting consisted of 4 nests containing a total of 10 eggs. From these eggs, two young pelicans fledged. In 1984, pelicans again nested on Gaillard Island. A total of 10 nests and 19 eggs were observed, and 11 pelicans fledged.

Surveys conducted during the current nesting season have recorded a dramatic increase in brown pelican nesting on Gaillard Island. A total of 115 nests in various stages of construction were observed in May 1985. Twenty-two of these nests contained a total of 29 eggs. It is anticipated that a scheduled July survey will document additional egg-laying activity at the colony site.

The Jacksonville, Florida, Endangered Species Field Station is preparing a recovery plan for the Florida torreya (*Torreya taxifolia*), an Endangered yew-like conifer endemic to a very limited area along the Apalachicola River in northwest Florida and adjacent Georgia. Most of the torreya's habitat is now protected in The Nature Conservancy's Apalachicola Bluffs and Ravines Preserve, which totals 4,382 acres. Unfortunately, the Florida torreya is affected by a variety of fungus infections that cause root rot, basal stem rot, and twig blight. The infections appear to be caused by a variety of native fungi that are able to attack the trees because they are stressed by drought or by some other presently unknown factor. O. Gary Brock of the Florida Department of Natural Resources reports that the native populations are in poor condition, with only a few of the largest stems producing pollen cones; no seed cones have been seen. Cultivated specimens are now established at sites in the Southeast and on the Pacific Coast. These specimens probably offer the best opportunity to understand the environmental requirements and diseases of the Florida torreya, and may also provide the only source of seed for the foreseeable future.

A task force has been established between the FWS and the Jacksonville District of the Army Corps of Engineers to address Endangered Species Act Section 7 concerns as they relate to the manatee (*Trichechus manatus*) and marina permit applications. As a result of the first meet-



Photo by Terry Graham

Plymouth red-bellied turtle

ing, a letter will be sent to marina owners requesting information on essential manatee resources, such as grass beds, fresh water outflow, and warm water. It is the intent of the task force to improve the Corps' review of permit applications to avoid possible impacts to the manatees.

Region 5—Last November, 10 hatchling Plymouth red-bellied turtles (*Pseudemys rubriventris bangsi*) were collected from the Plymouth-Carver, Massachusetts, area for headstarting in the New England Aquarium. On July 7, 1985, the turtles, weighing approximately 10 times their capture weight, were released in Crooked Pond, a part of the Massasoit NWR. Because of the success of this year's project, an additional 20 hatchlings will be collected for headstarting this fall.

Ten young bald eagles were collected during July 5–11 from Manitoba and transported to a New Jersey hack site on July 12, as part of the third year of a FWS/Canadian Wildlife Service cooperative translocation project. This year's climbers and FWS biologists operated with float planes from an island base camp approximately 8 hours northwest of Winnipeg.

Region 6—On June 13, 1985, a fourth population of pure greenback cutthroat trout (*Salmo clarki stomias*) was discovered during stream surveys within Rocky Mountain National Park. This fourth population was found in Hunters Creek within the North St. Vrain drainage. All lakes and most streams within this drainage in the park have now been surveyed. Thunder Lake and Hutcheson Lake have been identified in the Greenback Cutthroat Trout Recovery Plan as future greenback restoration areas.

Due to the growing success of The Peregrine Fund's Rocky Mountain Program, the nucleus of peregrine falcon pairs in Colorado continues to climb from a low of 4 egg-laying pairs in 1979 to 15 known pairs in 1985.

Region 7—When the Aleutian Canada Goose Recovery Team met last December, they recommended that after a total

of 50 birds or 15 breeding pairs were reestablished on Agattu Island, recovery efforts could shift to Amchitka Island. A spring 1985 survey confirmed that this goal has been reached on Agattu, and during August, Amchitka Island will be the release site for wild family groups of Aleutian Canada geese (*Branta canadensis leucopareia*) captured on Buldir Island. Amchitka has been free of Arctic foxes (*Alopex lagopus*) since the mid 1960's.

In anticipation of a major fox eradication effort on Kiska Island, the Aleutian Islands NWR staff recently combatted persistently inclement weather to complete an inventory of the island's bird and marine mammal population. Introduced Arctic foxes are numerous on the island, particularly in and adjacent to the Sirius Point auklet colony, one of the largest assemblages of birds in North America (containing an estimated 1.4 million birds). Other birds, such as song sparrows, which are common on many Aleutian Islands, were completely absent. If the fox removal effort succeeds, comparison with these data in future years will be extremely interesting.

A cooperative FWS/NPS study on the home range and movements of peregrine falcons is proceeding in the upper Yukon River area. Preliminary data from four radio-tagged birds indicates that nesting peregrines may range 8–9 miles from their eyries and that overlap among hunting territories of nesting female peregrines occurs with some regularity.

Recovery Plan Update

On July 2, 1985, a recovery plan for the Endangered Alabama lamp pearly mussel (*Lampsilis viriscens*) was approved. Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

New Publications

Ohio Endangered and Threatened Vascular Plants: Abstracts of State-listed Taxa is a 635-page volume containing one- to three-page abstracts on 367 species. It provides information on a number of topics, including biology and phenology, global and State range, and Federal and State legal status. Appendices contain the Ohio Endangered Plant Law and Administrative Rules, information on State plant collecting permits, and other relevant material. The price is \$17.25 (including postage) for a single book; Ohio residents should add \$0.83 State sales tax. Send a check or money order to Publications Center, Ohio Department of Natural Resources, Fountain Square, Columbus, Ohio 43224.

Proceedings on the symposium "Air Pollutants Effects on Forest Ecosystems" are available for sale. The 440-page book contains papers and posters dealing with the symptoms, causes, and potential effects of air pollutants on high- and low-elevation forests in North America and Europe, as presented at an international conference held last May in St. Paul, Minnesota. The symposium sponsors included agencies of the National Acid Precipitation Assessment Program (U.S. Forest Service, U.S. Environmental Protection Agency, U.S. Department of Interior, U.S. Department of Energy, and the National Oceanic and Atmospheric Administration); the German Marshall Fund of the United States; and Environment Canada. Copies of the proceedings may be ordered from The Acid Rain Foundation, 1630 Blackhawk Hills, St. Paul, Minnesota 55122. The cost in the U.S. is \$39.00, plus \$6.00 postage; for international orders, postage is \$16.00.

Proceedings-Workshop on Management of Nongame Species and Ecology

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	19	234	4	0	22	304	23
Birds	60	13	144	3	1	0	221	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	31	4	11	18	3	0	67	37
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	9
Plants	77	5	1	21	2	2	108	42
TOTAL	243	47	461	68	10	37	866	214**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 180

Number of species currently proposed for listing: 23 animals
29 plants

Number of Species with Critical Habitats determined: 84

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

July 31, 1985

ical Communities is a 404-page volume containing papers presented at a June 11-12, 1984, conference in Lexington, Kentucky, that was sponsored by the University of Kentucky. Topics covered at the workshop included "The Role of Nongame Management in Federal, State, and Private Agencies"; "Nongame Inventory Systems"; "Management Strategies for Nongame Communities"; "Nongame Management and the Nongame Wildlife User"; and "Coordination of Nongame Management With other Land Uses." Copies are available for \$5.00 (postpaid) from the Department of Forestry, Univer-

sity of Kentucky, Lexington, Kentucky 40546.

Copies of *A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem*, a popular November 1983 publication prepared by the GYE Bald Eagle Working Team, are available for \$10.00 (postpaid) from the Wyoming Game and Fish Department, Publications-BE, Cheyenne, Wyoming 82002. The book identifies specific threats to bald eagles in the area, and discusses in detail methods to protect and expand the population.

August 1985

Vol. X No. 8

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Protection Sought for Four Vulnerable Plants

Four species of plants were proposed by the Fish and Wildlife Service (FWS) recently for listing as Endangered. All four have experienced declines in their ranges and numbers, primarily as a result of human-related habitat loss. If the proposals become final, these plants and their habitats will receive the protection authorized under the Endangered Species Act.

Iliamna corei

This perennial plant gets its common name, Peter's Mountain mallow, from the only site at which it is found. The single population occurs on private land near the summit of Peter's Mountain in western Virginia (Giles County). When Dr. Earl Core discovered the species in 1927, there were about 50 plants growing vigorously in the soil-filled pockets of an exposed sandstone outcrop. They received full sunlight and produced "an abundant supply of seeds." In July 1984, however, observers counted only 5 plants (consisting of 55 stems) at the site.

The encroachment of competing vegetation and the subsequent reduction in direct sunlight reaching *I. corei* appear to be the main reasons for the population's reduced numbers and its decline in reproductive vigor. Although growth of the for-

est canopy has been a factor, the primary threat is competition from an introduced herbaceous species, the Canadian leafcup (*Polymnia canadensis*), which now dominates the site. How the leafcup became established there is open to speculation, but its spread may have been expedited by habitat disturbances associated with the completion of a nearby power transmission line or the construction of a hiking trail. This trail, now abandoned, was built through the *I. corei* colony and destroyed a number of plants directly. Scientific collecting also has been a problem for *I. corei*, as many botanists have visited the site since its discovery in 1927 to collect herbarium specimens. Some individuals and seeds of this attractive plant also have been taken for planting in home gardens. Any further collecting could be extremely detrimental. For this reason, the FWS did not propose designating Critical Habitat for this species, an action that would pinpoint the site by the required publication of maps and detailed geographical information; nevertheless, if it is listed, the plant will receive habitat protection.

There has been debate among botanists as to the taxonomic distinction be-

(continued on page 8)



Photo by Steve Croy

Iliamna corei (Peter's Mountain mallow) is a perennial growing 20–36 inches (0.5–0.9 meters) tall with large flowers that are rose or light pink in color.

Giant Kangaroo Rat Proposed for Addition to Endangered Species List



giant kangaroo rat (*Dipodomys ingens*)

Kangaroo rats of the genus *Dipodomys* are small mammals adapted for swift travel by hopping on their elongated hind legs. Several taxa are listed as Endangered, and the Fish and Wildlife Service (FWS) has proposed listing another, *D. ingens*, the giant kangaroo rat (F.R. 8/13/85). Widespread modification of its south-central California habitat has eliminated this species from 94 percent of its former range; the remaining habitat also is vulnerable.

The giant kangaroo rat's preferred habitat consists of native dry grasslands with well-drained, sandy-loam soils suitable for digging burrows. Historically, this rodent was distributed over approximately 2,000 square miles (527,600 hectares) from southern Merced County, through the San

(continued on page 9)



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of August:

Region 1—The Sacramento Endangered Species Office (SESO) staff met in

July with representatives of Lone Star Industries and Larry Seaman Associates to explore the procedures and time frames required to prepare a Habitat Conservation Plan (HCP) in conjunction with an application for an Endangered Species Act

(ESA) Section 10(a) permit. Recent surveys of sand parkland habitats in Santa Cruz County have documented the presence of remnant colonies of the Endangered Smith's blue butterfly (*Euphilotes enoptes smithii*) at Lone Star Industries' Olympia Quarry and a few adjacent properties. Lone Star's representatives indicated after the July 24 meeting that they plan to proceed with the development of a HCP. The SESO staff is contacting local government officials and all other property owners in the vicinity with known or potential habitat to encourage their participation in the development of such a plan.

Four bald eagle (*Haliaeetus leucocephalus*) nestlings were released on Catalina Island this summer, bringing the total number of birds released over the last 6 years to 24. At least 7 of the 20 birds released prior to 1985 still remain on the island. There have been seven confirmed mortalities; two birds were shot, one was electrocuted, and four died of unknown causes. One pair attempted to nest for the second year in a row, but laid no eggs.

The SESO staff met with consultants representing the Mayhews Landing Association, a development firm that has applied for a U.S. Army Corps of Engineers (COE) permit to construct a residential housing/golf course complex in the City of Newark, California. The 125-acre project site encompasses about 35 acres of wetlands, most or all of which provide habitat for the Endangered salt marsh harvest mouse (*Reithrodontomys raviventris*). Recent trapping at the site yielded an unprecedented 41 harvest mice on a portion of the wetlands. Realizing the major implications of such a project, the developer has asked the COE to place its permit application in abeyance for 4 months to provide an opportunity to resolve endangered species problems.

The SESO staff also assisted FWS law enforcement personnel in stopping a developer from discing and plowing a wetland area supporting salt marsh harvest mice. The developer destroyed about 50 acres within a one-week period after notification by registered mail that the harvest mouse occurred on his property and that "farming" activities may represent a civil or criminal violation of the ESA. A local newspaper article, quoting a representative of the landowners, documented that commercial development of the property is planned in 2 to 3 years, thus discrediting the contention that discing, plowing, and leveling were legitimate agriculture practices in this case. The SESO staff convinced the Environmental Protection Agency (EPA) and the COE to intervene by requiring all disturbances on the property to cease until a permit is ob-

(continued on page 10)

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska.

The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

Emergency Protection for Loch Lomond Coyote-thistle

On August 1, 1985, the Fish and Wildlife Service (FWS) published a temporary emergency rule to protect the Loch Lomond coyote-thistle (*Eryngium constancei*) as an Endangered species. This plant, which is found only in a 7-acre (2.8-hectare) vernal lake in southern Lake County, California, is vulnerable to extinction due to potential dredging and filling of its seasonal wetland habitat. During the 240-day life of the emergency rule, the FWS will take steps to help ensure the long-term survival of *E. constancei*.

Despite its common name, the species is not a thistle but a perennial herb of the parsley family. The plant annually produces leafless flowering stalks growing up to 12 inches (30 centimeters) high from an overwintering rootstock. A dense "down" of minute hairs, unique to *E. constancei*, covers the stalks and the long, slender basal leaves.

Rain fills the vernal lake bed during winter, and *E. constancei* sprouts, blooms, and sets seed as the water recedes in the spring and summer to reveal a seasonal "meadow." The basin has unusual soil conditions which, together with its hydrological characteristics and surrounding topography, may account for the unique presence of *E. constancei* at the site. Among the other plant species growing in the vernal lake bed are two candidates for Federal listing under the Endangered Species Act, *Navarretia pauciflora* (few-flowered navarretia) and *N. plieantha* (many-flowered navarretia). The latter already is designated by the State of California as endangered, a classification the State also plans to apply to *E. constancei*.

The primary threat facing *E. constancei* is the dredge-and-fill operation proposed by an agent representing the owner of the vernal lake. Approximately 15 percent of the lake bed was dredged and filled in July 1984, which probably resulted in a corresponding reduction in the plant's population. Failure to secure the proper permits and approvals for this action resulted in a county-imposed fine, a halt in the work, and a court order to repair the damage. Nevertheless, the owner's agent has expressed a desire to complete the dredge-and-fill project for the remainder of the vernal lake. If that were to happen, *E. constancei* undoubtedly would become extinct.

The U.S. Army Corps of Engineers (COE) is responsible under Section 404 of the Federal Water Pollution Control Act (Clean Water Act), as amended, to regulate the discharge of dredged or fill material into the waters of the United States. Filling isolated wetlands, like the vernal lake, is authorized by a general nationwide COE permit as long as certain

conditions are met. One such condition is that the "discharge will not jeopardize a threatened or endangered species as identified under the Endangered Species Act." Because of the need to preserve the physical integrity of the lake, the FWS requested on April 3, 1985, that the COE assert individual permit authority over the vernal lake, as allowed under COE regulations. This would require the vernal lake owner's agent to apply for an *individual* COE permit for any dredge-and-fill work at the site. The COE deferred action on the FWS request until about the time that the emergency listing rule for the Loch

Lomond coyote-thistle was published, when it did assert individual permit authority.

Under Section 7 of the Endangered Species Act, all Federal agencies, including the COE, are required to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species. Because the Loch Lomond coyote-thistle is now listed as Endangered, COE is required to consult with the FWS on any proposed action, such as permitting a dredge-and-fill operation, that may affect the species.

As required by the court settlement on the illegal 1984 dredge-and-fill work, the vernal lake owner's agent has repaired the physical damage to the lake bed. He also is required to reseed the disturbed land in native plants, including the coyote thistle. The Nature Conservancy is looking into purchasing the vernal lake in order to ensure the long-term protection of its unusual plant resources, and the California Department of Fish and Game also has expressed an interest in the site.



A view of habitat damage at Loch Lomond caused by an illegal dredge-and-fill operation.

Photo by Jim Bartel

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313/763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

Savannas and Bogs of the Southeastern U.S.: Threatened Ecosystems

by Cary Norquist
Jackson, Mississippi, Endangered
Species Field Office

Savannas and bogs have long been noted for their unusual and diverse flora. These poorly-drained, fire-maintained communities occur in the Gulf and Atlantic Coastal Plain regions, from North Carolina south to Florida and east to Texas. Both are characterized by the prominence of herbaceous plants and the absence of a distinct shrub or tree layer.

(*Dionaea muscipula*). Other endemic plants include several species of *Xyris* (yellow-eyed grasses), *Eriocaulon* (pipe-worts), *Lachnocaulon* (bog buttons), *Polygala* (milkwort) *Rhynchospora* (beak-rushes), *Habenaria* (fringed orchis), *Calapogon* (grass-pinks), *Lachnanthes caroliniana* (redroot), *Dichromena latifolia* (white-topped sedge), *Lophiola americana* (golden-crest), and *Ctenium aromaticum* (tooth-ache grass).

According to reports by early explorers, savannas and bogs once covered vast

have been converted into farm ponds. The natural cycle of periodic fires has been disrupted by the practice of fire control, while various kinds of habitat alterations often restrict the spread of natural fires that still occur. As a result, many savannas and bogs have been lost through succession.

With the loss of these important ecosystems comes the possible extinction of many of their associated plants, a number of which are now under review by the Fish and Wildlife Service (FWS) to determine if they should be listed for protection under the Endangered Species Act. An example is *Lindera subcoriacea* (bog spice bush), a recently described deciduous shrub, and one of the three *Lindera* species in North America. This particular species occurs in openings of permanently wet, sphagnum, evergreen shrub bogs in the Gulf Coastal Plain of Mississippi and Louisiana and along wet, peaty drainages in the Atlantic Coastal Plain of North Carolina. The Mississippi Natural Heritage Program (MNHP), Mississippi Museum of Natural Science, is currently conducting a status survey of the bog spice bush in the Gulf Coastal Plain for the FWS.

Until recently, *L. subcoriacea* was believed to be endemic to the Gulf Coastal Plain of Mississippi and Louisiana; however, additional populations have been discovered in ecologically similar habitats by the North Carolina Natural Heritage Program (NCNHP) in the Sandhills Region of North Carolina. The MNHP staff has verified seven extant populations (approximately 150 plants) in the Gulf Coastal Plain. Several of these populations are declining and consist of only a few individuals. In North Carolina, popula-



a savanna in the Green Swamp, North Carolina

The term savanna describes a relatively expansive, flat area with scattered trees and shrubs. Bogs are essentially treeless, generally occur further inland, and may occupy bowl-shaped depressions, small stream terraces, and, occasionally, hillsides. Savannas may become dry during seasons of low precipitation, while bogs usually remain water-logged throughout the year.

Without frequently occurring fires, savannas and bogs are invaded by fire-intolerant woody species that shade and eventually overshadow the heliophytic (sun-loving) plants that characterize these open areas. Soil conditions interact with fire to regulate plant succession. Low nutrient, acidic soils, coupled with a seasonally high water table, limit the establishment of woody species. With a complete absence of fire, these communities may succeed to a number of interrelated woody vegetation types, such as an evergreen shrub bog or a swamp forest.

Savannas and bogs are very diverse ecosystems and are habitat for many endemic species. They perhaps are best known for their many species of carnivorous plants, including pitcher plants (*Sarracenia* sp.), sundews (*Drosera* sp.), bladderworts (*Utricularia* sp.), butterworts (*Pinguicula* sp.), and the venus fly-trap

areas of the of the southeastern coastal plains; however, it is estimated that over 97 percent of these ecosystems no longer exist today. Many have been drained and converted to pine plantations or pastures, while others, particularly hillside bogs,



Prescribed burning is a management tool for reducing woody plant encroachment in savannas and bogs.



bog spice bush (*Lindera subcoriacea*)

tions are all within a 20-mile radius and total fewer than 150 plants. Woody encroachment due to fire suppression continues to dampen the species' vigor. Throughout the year, the MNHP and NCNHP will continue their search for additional populations, and will carry out an assessment of threats to the species.

Lilium iridollae, the panhandle lily, is a showy herb that inhabits bogs, savannas, borders of shrub bogs, and banks of

blackwater creeks in northwestern Florida and adjacent Alabama. Historically, it was known from 20 sites, but many have been destroyed through habitat modification, grazing, and overcollecting by wildflower enthusiasts. A 1980 status survey on this species resulted in an estimate that no more than 10 populations exist and that many consisted of only a few individuals. Since *Lilium iridollae* has such a limited number of known populations, the loss of any of its habitat could jeopardize the species' survival.

In central Alabama, there are a number of sandy-gravelly bogs that are habitat for the insectivorous Alabama canebrake pitcher plant (*Sarracenia rubra* ssp. *alabamensis*). This subspecies is endemic to three counties in central Alabama. Many of the original populations have been lost through woody succession, while other sites have been converted to pasture or row crops. Most of the populations adjacent to railroads have been extirpated by herbicide application. Collecting has also greatly contributed to the overall decline of this species and, in several cases, has been responsible for the loss of an entire population. Currently, the Alabama canebrake pitcher plant is known from approximately 12 sites. Only 3 of the populations are of significant size; the others are declining in vigor and are in need of management.

Pinguicula planifolia (Chapman's butterwort) and *P. ionantha* (violet-flowered butterwort) are two of the six southeastern species of *Pinguicula*. Both may occur in bogs, depressions in savannas, along margins of peaty ponds, and in shallow standing water. *P. planifolia* is found in this type of habitat throughout the coastal counties of Mississippi, Alabama, and Florida, while *P. ionantha*,

the rarest species in the genus, is restricted to a four-county area in the panhandle of Florida. As with all plants in these ecosystems, they are threatened by any activities that would make the habitat drier or less open.

These are only a few of the plants in the savannas and bogs of the Gulf Coastal Plain that are candidates for listing. Their unique ecosystems, which are of aesthetic as well as scientific value, continue to decline at a rapid rate. The Endangered Species Act recognizes the fact that the only way to conserve species is by conserving their habitat. In this case, however, conservation means more than simply protecting these areas from destruction. To maintain savannas and bogs, they must be frequently burned in accordance with accepted management practices. Further research will be needed to determine how best to apply fire as a tool to benefit each species.



violet-flowered butterwort (*Pinguicula ionantha*)

Photo by Andy Robinson

Listing Proposal for Endemic Idaho Snail

A species of snail found only on two small hot springs and their immediate outflows in arid Owyhee County, southwestern Idaho, has been proposed by the Fish and Wildlife Service (FWS) for listing as Endangered (F.R. 8/21/85). The main threat to its survival is the drastic and continuing reduction in groundwater that feeds the springs upon which the snail depends.

A formal scientific name and description for the snail has not yet been published; however, biologists have been studying its anatomy and have determined that it represents a previously unknown genus and species in the family Hydrobiidae. Adults of the species reach only about 5 millimeters (0.2 inch) in shell length. A common name for the species has been suggested, the Bruneau hot spring snail, after the general area in which it is found.

An essential part of the species' extremely restricted range is the flow from

springs in a vertical rock face, where the snails feed on surface algae. This rock face provided habitat for most of the snails until ground water mining reduced spring discharge rates. Flows at these springs now are at less than 10 percent of 1954 levels, and at times are even much lower than these reduced levels. Snails are becoming increasingly dependent on the outflow streams, which are vulnerable to periodic scouring by flash floods during heavy rains. The outflows occupied by the species total approximately 305 meters (1,000 feet) in one stream and 122 m (400 ft) in the other. Further lowering of the water table could eliminate these flows altogether and lead to the unique snail's extinction.

If the proposal to list the Bruneau hot spring snail becomes final, this small mollusk will receive the protection authorized under the Endangered Species Act. The major benefit would probably be the habitat conservation measures in Section 7 of

the Act, which requires Federal agencies to ensure that none of their activities are likely to jeopardize listed species. In this case, the Bureau of Land Management (BLM) administers the property containing the springs and their most immediate outflows. (Downstream habitat is privately owned.) Current BLM management is consistent with conservation of the snail, and the agency is not now issuing permits for land entry near the spring site. Future issuance of such permits, however, could be subject to Section 7 consultation with the FWS. This habitat protection will apply to the Bruneau hot spring snail, if it is listed, even though the possibility of vandalism or overcollecting made it imprudent to publicize the species' range with a proposed designation of Critical Habitat.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 1 (address on page 2), by October 21, 1985.

Final Endangered Species Act Protection for Four Plants and Three Fishes

The following four plants and three fishes were added recently to the List of Endangered and Threatened Wildlife and Plants. They now receive the benefits of all protective measures authorized by the Endangered Species Act.

Buxus vahlii

Buxus vahlii (Vahl's boxwood) is a small tree or shrub that grows only in the semi-evergreen seasonal forests that occur on limestone in northern and northwestern Puerto Rico. With only 40 individuals of the species known to exist, Vahl's boxwood is vulnerable to extinction from potential habitat modification or destruction from limestone mining and urban development. This prompted the Fish and Wildlife Service (FWS) to publish a proposed rule to list *B. vahlii* as Endangered on July 13, 1984 (story in BULLETIN Vol. IX No. 8), and subsequently the final rule (F.R. 8/13/85).

Vahl's boxwood can be found only at two small, isolated locations—one on Commonwealth of Puerto Rico land in Punta Higuero (Rincón) and the other about 70 miles away on privately-owned land in Hato Tejas (Bayamón). The Rincón site is a possible area for the construction of a coal-fueled power plant by the Puerto Rico Electrical Power Authority and the Federal Rural Electrification Administration. Such a power plant would require a large storage area for coal and cinder, which could destroy up to 20 plants and destroy or modify their habitat. Air pollution from the power plant could also affect the species.

The Hato Tejas population of about 24 individuals is located in a group of "haystack" hills (limestone hills with a characteristic haystack shape) that is surrounded by a large shopping center, several commercial and industrial lots, and an old limestone quarry. The possibility exists for further development of the area, which could completely destroy the boxwood's habitat. Past mining activities have already destroyed more than half of this population since the 1950's.

Gardenia brighamii

In a final rule published in the *Federal Register* on August 21, 1985, the FWS listed an extremely rare plant, *Gardenia brighamii* (Hawaiian gardenia or *na'u*), as an Endangered species. *G. brighamii* is a distinctive tree reaching 20 to 30 feet (6 to 9 meters) in height with a spreading canopy of shiny dark-green leaves. Its white-to cream-colored flowers are very fragrant, and resemble those of the Tahitian gardenia (*G. taitensis*). This species once grew on five of the main Hawaiian Islands

where, at least on the island of Moloka'i, it was a fairly common component of the native dryland forests. Today, it occurs only on the islands of Lana'i (about six plants), Moloka'i (two plants) and O'ahu (one plant), and is believed to be extirpated on Hawai'i and Maui.

Grazing and browsing by domestic and feral animals, and the invasion of exotic shrubs, forbs, and grasses, are severely degrading the Hawaiian gardenia's habitat. Urban development, pineapple and sugar cane fields, and pastures have replaced most of the dryland forests in the Hawaiian Islands, leaving limited habitat available for *G. brighamii*. Potential development on or near the areas where the few remaining plants occur could destroy the rest.

The continuing threats to the few remaining *G. brighamii* individuals led the FWS to propose listing the species as Endangered on October 12, 1984 (see BULLETIN Vol. IX No. 11). A formal designation of Critical Habitat was part of the proposed rule, but, during the public comment period, the FWS received information indicating that the area proposed as Critical Habitat did not accurately reflect the species' habitat needs. After a thorough review of the data, the FWS now believes that a formal designation of Critical Habitat is not prudent; however, the species and its habitat will still receive protection under Section 7 of the Endangered Species Act.

Primula maguirei

A small perennial herb with conspicuous lavender-colored flowers, *Primula maguirei* (Maguire primrose) is found only in a limited area of Logan Canyon in Cache County, Utah, on land managed by the U.S. Forest Service. *P. maguirei* is typically found growing on northerly exposed damp ledges, crevices, and overhanging rocks along the canyon walls. Currently, there are nine known populations, one of which contains approximately 100 plants; the remainder each contain fewer than 30. Collecting and rock climbing threaten all nine populations, while some (including the largest and most vigorous population) are threatened also by potential highway construction.

Although it is not in immediate danger of extinction, the Maguire primrose is rare, restricted in range, and highly vulnerable to habitat modification. The species was proposed for listing as Threatened on April 13, 1984 (see BULLETIN Vol. IX No. 5). During the public comment period following the proposal, the only opposition to the listing was expressed by the Utah Cattleman's Association, which

stated its concern about the effects that a listed plant species could have on any future improvements of U.S. Highway 89, which passes through *P. maguirei* habitat in Logan Canyon. In the final listing rule (F.R. 8/21/85), the FWS recognized the concerns of this association. Through interagency consultation, ways usually can be found to meet project goals while conserving listed species. In this case, the Utah Department of Transportation has stated that there are no current plans for highway improvements in Logan Canyon other than routine maintenance, and that *P. maguirei* populations would be avoided in any future projects.

Townsendia aprica

Townsendia aprica (Last Chance townsendia), also known from Utah, is a herbaceous perennial less than one inch (2.5 centimeters) tall belonging to the aster family. Currently, there are 12 population sites scattered over an area about 30 miles (48 kilometers) across in eastern Sevier, western Emery, and north-central Wayne Counties. *T. aprica* occurs on silty soils of a formation subject to disturbance by coal mining and oil and gas drilling. Other threats to the species' survival include current and potential off-road vehicle use, cattle grazing and trampling, and highway construction.

Approximately 2,000 individuals are known to exist, most growing on land managed by the Bureau of Land Management. A few are found on private property, and a small population exists within Capitol Reef National Park. The first discovered population, containing about 400 plants, is in Sevier County's Last Chance Creek drainage, hence the species' common name. Most of the habitat under Federal ownership (about 80 percent) is under lease either for coal, oil, or gas. A cattle driveway and Utah Highway 72 traverse the habitat of the Last Chance Creek population.

A proposed rule to list *T. aprica* as Endangered was published in the May 29, 1984, *Federal Register* (see story in BULLETIN Vol. IX No. 6). This proposed classification was based upon the best information available at that time, which indicated that the species was found in only 3 disjunct populations with a total of 215 individual plants. However, during the 1984 field season, more accurate status information became available. After evaluating the threats and the new data, the FWS determined that the species is vulnerable but not in immediate danger of extinction, and that it should be listed as Threatened. The August 21, 1985, final rule reflects this more biologically appropriate classification.

Available Conservation Measures

Among the conservation measures that are now available to each of these newly listed Endangered or Threatened plants are a requirement for the FWS to develop and implement plans for their recovery; possible Federal funding to States that have approved Endangered Plant Cooperative Agreements with the FWS; and protection from adverse effects of Federal activities. Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. The Federal agencies involved with these final listing rules (Federal Rural Electrification Administration, Bureau of Land Management, U.S. Forest Service, and National Park Service) are aware of their responsibilities to protect listed species, and must enter into consultation with the FWS if any of the plants might be affected by their activities. Section 7 provisions apply to all four plants even though a formal designation of Critical Habitat was not a part of any of the final rules.

Section 9 of the Act makes it unlawful to remove Endangered plants from lands under Federal jurisdiction, and this protection will also apply to Threatened plants once implementing regulations are completed. In addition, interstate/international trafficking in listed plants without a permit is prohibited, but for those listed as Threatened, properly documented seeds of cultivated specimens are exempt from this prohibition.

Owens Tui Chub

According to the Desert Fishes Council, the status of the Owens tui chub (*Gila bicolor snyderi*) is the most precarious of any fish in the region of Death Valley, California. This small fish is known to survive in less than one percent of its original range.

Currently, viable populations of the Owens tui chub exist at two locations in the Owens Basin of Mono County: the headwater springs of Hot Creek and approximately 8 miles (13 km) of the Owens River below Long Valley Dam. It has been eliminated from most of its former range by habitat alteration, predation and competition from introduced fishes, and hybridization with a related but non-native subspecies of tui chub. These factors continue to jeopardize the survival of the few remaining taxonomically distinct Owens tui chubs. Accordingly, on March 23, 1984, the FWS proposed to list this fish as endangered and to designate Critical Habitat for the occupied sites (see BULLETIN Vol. IX No. 4). The final rule was published August 5, 1985.

Both current sites are within the Inyo National Forest boundary, but are owned

by the city of Los Angeles, which is the single largest consumer of Owens Basin water. The city's Department of Water and Power supported the listing, but questioned the need for designating Critical Habitat. In response, the FWS noted that the Critical Habitat designation may aid in the development of management plans, and that it is required by law for listed species except under certain circumstances. The final Critical Habitat designation includes a 50-foot (15-meter) riparian conservation zone along both sides of the river and surrounding the Hot Creek headwaters. Maps of these areas are available in the August 5 listing rule.

As part of a general recovery program, the California Department of Fish and Game, the FWS, and the Bureau of Land Management plan to continue earlier efforts to reintroduce Owens tui chubs into Fish Slough (also in Mono County), an area within the subspecies' historical range.

Conasauga River Fishes

The amber darter (*Percina antesella*) and the Conasauga logperch (*Percina jenkinsi*) are known only from the upper Conasauga River basin in Georgia and Tennessee. Because of their restricted range and numbers, the survival of these fishes could be jeopardized if water development projects now being considered for the basin are implemented without considering the species' ecological requirements. Other factors that could degrade their habitat, such as water pollution from urban or agricultural runoff, pose additional threats. For these reasons, the FWS proposed on July 13, 1984, to list both species as Endangered and to designate their Critical Habitat (see BULLETIN Vol. IX No. 8). The final rule was published August 5, 1985.

Included in the 1984 listing proposal was a recommendation for classifying the trispot darter (*Etheostoma trisella*), which also occurs in the Conasauga River, as Endangered. Subsequently, however, two new populations of this species were discovered. Based on this new information, the trispot apparently still qualifies for a listing (as Threatened rather than Endangered), but the FWS is deferring a decision on listing for 6 months (until January 13, 1986), as authorized in Section 4(b)(6) of the Endangered Species Act. Additional surveys will be conducted in the meantime to clarify the trispot's biological status.

The final listing rule designates 33.5 miles (53 km) of the Conasauga River as Critical Habitat for the amber darter and 11 miles (17 km) for the Conasauga logperch; some of these areas overlap. (See maps in the August 5, 1985, *Federal Register*.) The U.S. Army Corps of Engineers (COE) is the only known Federal agency whose future activities might adversely modify the Critical Habitat. For

several reasons, the COE is evaluating alternatives for meeting the area's water supply needs. The FWS believes that, once these alternatives are fully considered, water development and habitat conservation can be compatible. Both agencies are discussing various approaches.

The protection given listed fish and other animals under the Endangered Species Act is like that extended plants, except for the wider prohibition on the "take" of animals without a permit.

Hunting of Grizzly Bears is Reduced

The FWS has published an emergency rule modifying the special regulations that allow limited hunting of the Threatened grizzly bear (*Ursus arctos*) in northwestern Montana (F.R. 8/29/85). For 1985, grizzly hunting will cease once the number of human related bear mortalities in the area (outside of Glacier National Park) reaches 15, or once the number of female bears killed reaches 6. This is a reduction from the previous annual quota.

Background

The grizzly bear historically occurred throughout western North America, from Alaska to central Mexico. Its populations in the conterminous U.S. are now restricted to northeastern Washington, northern and eastern Idaho, western Montana, and northwestern Wyoming. Fewer than 1,000 grizzlies are thought to survive in these areas. Most of these remaining bears occupy the Northern Continental Divide Ecosystem (NCDE) in northwestern Montana.

In the July 28, 1975, *Federal Register*, the FWS published a rule listing grizzly bears in the conterminous 48 States as Threatened. At the same time, special regulations were issued to allow for limited hunting of the grizzly in the Flathead National Forest, the Bob Marshall Wilderness Area, and the Mission Mountains Primitive Area (now the Mission Mountains Wilderness Area) of the NCDE in northwestern Montana. Such hunting was to cease once the number of grizzlies killed throughout northwestern Montana during any one year, from all causes, reached 25.

The Montana Department of Fish, Wildlife and Parks has estimated the 1985 grizzly population in the NCDE to contain 580 bears, of which 387 are found outside of Glacier National Park; however, the grizzly's status varies from place to place within the ecosystem. In some areas, particularly the Mission Mountains, the grizzly is declining. A different situa-

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Grizzly

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tion exists along the Rocky Mountain front in the eastern part of the NCDE. The 1975 special regulations did not allow grizzly hunting beyond the boundaries of the Flathead National Forest and the Bob Marshall Wilderness Area. More grizzlies are now evident in some places along the front than in 1975, and some are moving down onto private lands, where they prey on livestock and pose a potential threat to human safety. Live-trapping and relocation of bears has met with only limited success. The FWS believes that problems in these areas will escalate and that currently available control measures are inadequate. Confrontations between

people and bears could develop, and would probably result in the destruction of the bears.

Because of the two different critical situations—the decline of the grizzly in the Mission Mountains and the escalation of human/grizzly problems on the eastern front of the Rockies—the FWS decided that an immediate change was needed in the hunting regulations. Hunting of grizzly bears in northwestern Montana will be allowed in parts of the east front. Such hunting could tend to eliminate those bears most likely to have encounters with humans and may cause the remaining grizzlies in these areas to become more fearful of people. Hunting, however, will stop once the number of bears killed during calendar year 1985 (outside of Glacier National Park, where hunting is prohib-

ited) reaches 15. Of this number, no more than six females can be taken, and there will be no hunting of grizzlies that are accompanied by young. Further restrictions and other details are published in the August 29, 1985, *Federal Register*.

The FWS believes that this level of hunting will still allow a general increase in grizzly numbers, even taking into account the estimated illegal kill of about eight bears each year in the NCDE. Before the 1986 hunting season, the FWS expects to have new permanent regulations in place.

Hunting of grizzly bears remains prohibited in the Greater Yellowstone Ecosystem and all other parts of the conterminous 48 States where it is not expressly allowed.

Four Plants

(continued from page 1)

tween *Iliamna corei* and a closely related species, *Iliamna remota*, which is also a candidate for listing at some time in the future. According to the FWS, however, the most comprehensive information published to date indicates that the two plants are distinct species. Since the threats to *I. remota* do not appear to be as immediately serious as those to some other taxa, action on its listing is being deferred for the present.

The proposal to list *I. corei* as an Endangered species was published September 3, 1985. Comments on the proposal are welcome, and should be sent to the Regional Director, Region 5 (address on page 2) by November 4, 1985.

Mezoneuron kavaense

Endemic to the Hawaiian Islands, this tree was well known to the early natives, who called it *uhiuhi*. It can reach up to 34 feet (10 meters) in height and 12 inches (30 centimeters) in trunk diameter. The dark-colored wood is extremely hard, close-grained, and durable, which made it suitable for use in spears and fishing devices. Cutting of trees for making these tools probably was not a major factor in the decline of this species, although so few remain that further cutting could jeopardize its survival.

At one time, *M. kavaense* was fairly abundant on the islands of Hawai'i, O'ahu, Kaua'i, and Maui. Unfortunately, it has become extirpated on Maui and only three small populations, totalling fewer than 50 trees, survive on the other islands. On Hawai'i, one colony is perched on the slopes of the volcano Hualalai. This land is a mixture of private and State-owned property used for cattle grazing. The populations in Waimea Canyon on Kaua'i and the Wai'anae Mountains of O'ahu are located on State lands

that, although zoned for conservation, contain feral livestock. The zoning does not provide specific protection for the plant.

Grazing by introduced cattle, goats, and sheep is the main reason for the decline of *M. kavaense*, and it continues to threaten the remaining trees. In recent years, the plant's regeneration has been severely inhibited. Not only does livestock feed on shoots, seedlings, and saplings; the black coffee tree borer (*Xylosandrus compactus*), a non-native insect, also attacks the young trees. On the island of Hawai'i, introduced rodents take *M. kavaense* seeds from fruit on the ground and in the trees. Still another threat is competition from exotic plants, particularly fountaingrass (*Pennisetum setaceum*). Consequently, only the O'ahu population of *M. kavaense* still shows any signs of successful reproduction.

M. kavaense was proposed for listing as an Endangered species in the August 5, 1985, *Federal Register*. Comments on the proposal are welcome from all interested agencies, organizations, and individuals, and should be addressed to the Regional Director, Region 1 (address on page 2 of the BULLETIN), by October 4, 1985.

Chrysopsis floridana

Also known as the Florida golden aster, this plant is a perennial herb endemic to small areas in southern Hillsborough and Pinellas Counties, Florida. It grows in open, sunny areas within sand pine-evergreen oak scrub vegetation on well-drained, sandy soil. (In the past, it also grew on beach dunes.) Urban development has eliminated the species from much of its former range, and a variety of threats still face *C. floridana*.

All of the remaining habitat is on privately owned land. The two largest remaining *C. floridana* populations are restricted to vacant lots within growing residential subdivisions. Other, smaller populations are in scrub vegetation

grazed by cattle, on an abandoned railroad embankment, and in a recently burned sand pine scrub area.

Because *C. floridana* requires open areas with bare sand, it can benefit from certain kinds of temporary disturbances, such as limited fire, land clearing, grazing, and even off-road vehicle (ORV) use. It can be destroyed, however, by more intense, frequent, or extensive disturbance, including dumping and heavy ORV use. The plant also does not tolerate mowing.

C. floridana was proposed for listing as an Endangered species on August 5, 1985. Comments on the proposal are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, 2747 Art Museum Drive, Jacksonville, Florida 32207 by October 4, 1985.

Lindera melissifolia

This small deciduous shrub, the pondberry, is native to a limited number of sites, most of them in the southeastern U.S. It grows to approximately 6 feet (2 meters) tall, and produces pale yellow flowers in early spring before the leaves emerge. The fruit, a bright-red drupe (a fleshy, single-seeded fruit), matures in late autumn. *L. melissifolia* can be distinguished from the two other North American members of its genus by its drooping, membranaceous leaves that have a strong, sassafras-like odor when crushed.

Since it was described in 1788, *L. melissifolia* has been reported from nine States, but it is believed to have become extirpated from Florida, Alabama, and Louisiana. Loss and alteration of its habitat has been, and continues to be, the main threat to the species' survival. The poorly drained depressions and margins of limestone sinks in which the plant grows have been tremendously reduced in number and/or quality by land clearing and drainage activities.

Twelve populations of *L. melissifolia* are known to survive: one in Bladen

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Four Plants

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County, North Carolina; four on U.S. Forest Service (USFS) land in Berkeley County, South Carolina; one in Wheeler County, Georgia; one on a USFS Research Natural Area in Sharkey County, Mississippi; one on State conservation land in Ripley County, Missouri; and four in Clay County, Arkansas. Almost all of these populations have declined since their discovery, some severely.

The most significant threat to *L. melissifolia* is drainage ditching and subsequent conversion of its habitat to other uses, including tree farming, crop production, and house construction. Even ditching without later changes in land use can alter the hydrology in ways that kill the plant or reduce its vigor. Aggressive weedy plants adapted to disrupted habitat can outcompete the species. Despite the regular production of mature fruits, no *L. melissifolia* seedlings have been observed in recent years at any of the known sites. The cause of this apparent lack of sexual reproduction is unknown, but the potential long-term results could be devastating.

L. melissifolia receives some legal protection in North Carolina and Missouri, which both list the species as endangered under their own plant protection programs. On August 13, 1985, the FWS proposed listing *L. melissifolia* as Endangered under the Federal Endangered Species Act. Comments on this proposal are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by October 15, 1985.

Available Conservation Measures

If the four plants become listed, they and their habitats will receive the protection authorized under the Endangered Species Act. Among the conservation measures that would apply are the prohibitions on interstate or international trafficking in these species without a permit, the requirement for the FWS to develop and implement recovery plans, and the possibility of Federal aid to States that have approved Endangered Species Cooperative Agreements with the FWS for plants.

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. This provision will apply for the four plants if their listing proposals become final, even though the FWS deemed it imprudent to pinpoint the populations with a Critical Habitat designation. At this time, the only potential Federal actions known that could directly effect any of the species are certain USFS management practices on national forest land occupied by *Lindera melissifolia*. Activities such as logging, road building, and drainage ditching, if planned without regard for the species, could jeopardize its survival; however, through interagency consultation, harmful impacts usually can be averted.

Section 9 of the Endangered Species Act makes it illegal to "remove and reduce to possession" Endangered plants from lands under Federal jurisdiction without a permit. This provision would apply to *L. melissifolia* on natural forests if the species is listed; none of the other three proposed plants are known to occur on Federal lands.

Nontoxic Shot Zones to Apply This Fall

A Federal judge has issued a preliminary injunction enjoining the FWS from allowing waterfowl hunting this fall in 22 counties of 5 States unless those States agree to require hunters to use nontoxic shot. The ruling was in response to a lawsuit filed by the National Wildlife Federation against the FWS and the Department of the Interior, and was issued August 26 by the U.S. District Court in Sacramento, California. It affects portions of California, Oregon, Illinois, Missouri, and Oklahoma.

Under the Migratory Bird Treaty Act, all areas of the U.S. are closed to waterfowl hunting except where opened by the FWS through hunting regulations established each year. The court ruling prohibits the FWS from opening the 1985–86 waterfowl season in the affected areas unless the States first approve regulations requiring the use of nontoxic shot. As a result, the States are now indicating that they will require nontoxic shot in the areas affected by the court ruling.

The judge concluded that the mandatory use of nontoxic shot was required to prevent lead poisoning in bald eagles (*Haliaeetus leucocephalus*). Bald eagles sometimes feed on sick, crippled, or dead waterfowl and can get lead poisoning from shot embedded in the bodies of such birds. Because of this threat to bald eagles, which are protected in the conterminous 48 States under the Endangered Species Act, the FWS proposed on February 13, 1985, to require nontoxic shot for waterfowl hunting in 30 counties within 8 States—Iowa, Kansas, South Dakota,

California, Oregon, Missouri, Illinois, and Oklahoma. (These areas were in addition to portions of 30 States where nontoxic shot zones had already been established to prevent lead poisoning in waterfowl.) In response to the Service's proposal, Iowa, Kansas, and South Dakota agreed to require nontoxic shot; the other five States—those now affected by the injunction—declined to approve the regulations. The FWS is required by law to obtain State approval before nontoxic shot regulations can be implemented or enforced.

On May 7, 1985, the FWS issued final regulations requiring nontoxic shot in portions of Iowa, Kansas, and South Dakota. It also announced its intention not to open waterfowl hunting season next year in 22 counties of the 5 States that had declined to approve the proposed nontoxic shot regulations unless the States agreed to require nontoxic shot next year (see BULLETIN Vol. X No. 6). The FWS felt the States needed time to reconsider their decisions and make necessary arrangements to facilitate the use of nontoxic shot. In June 1985, however, the National Wildlife Federation filed suit to force the FWS to require nontoxic shot in the 22 counties this year or, alternatively, not allow waterfowl hunting there at all. On August 26, the judge ruled in favor of the Federation.

Requests for detailed information on the nontoxic shot zones should be directed to the affected State wildlife agencies.

Kangaroo Rat

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Joaquin Valley, to southwestern Kern and northern Santa Barbara Counties. Recent surveys, however, indicate that barely 6 percent of this range is still occupied. Substantial populations survive only in a few areas at the southern edge of the original range, and even the status of these populations is precarious.

Conversion of native grasslands for crop production has been the main factor in the giant kangaroo rat's decline and continues to jeopardize the species. It apparently is unable to survive where the processes of cultivation destroy its burrows and food caches. Some habitat also has been lost to urbanization and the development of oil and natural gas fields. Rodent control programs and the indiscriminate use of rodenticides also have reduced or eliminated some populations of the giant kangaroo rat. In some instances, this species was the target of the program; in others, its destruction was inadvertent.

Other unique San Joaquin Valley animals that are in trouble include the Fresno kangaroo rat (*D. nitratooides exilis*), San Joaquin kit fox (*Vulpes macrotis mutica*), and blunt-nosed leopard lizard (*Gambelia silus*), all listed as Endangered. Two others, the Tipton kangaroo rat (*D. n. nitratooides*) and Nelson's antelope squirrel (*Ammospermophilus nelsoni*), are Category 2 candidates for listing. Some of the giant kangaroo rat's main colonies are found within the

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Kangaroo Rat

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foraging range of the California condor (*Gymnogyps californianus*), one of the world's most critically Endangered birds.

If the proposal to list the giant kangaroo rat as an Endangered species becomes final, this animal and its habitat will receive the full protection authorized under the Endangered Species Act. Among the available conservation measures is the prohibition on taking listed species without a permit, a factor that people planning rodent control programs would need to take into account. Another benefit is the possibility of Federal aid to State conservation programs; California already lists the giant kangaroo rat under its own legislation as endangered and has an Endangered Species Cooperative Agreement with the FWS.

Regional Briefs

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tained. Application for a permit will trigger ESA Section 7 consultation.

Barbara Massey and Dick Zembal (FWS) have just finished the 1985 light-footed clapper rail (*Rallus longirostris levipes*) census. They did the census on their own time and money, as no Section 6 funds were available for the project this year. The results, compared with those of 1984, are tabulated below. Where known, the sex of the bird was included.

The SESO staff and California Department of Fish and Game personnel searched on July 26 for the delta coyote-thistle (*Eryngium racemosum*), a Category 1 candidate for future listing, at Salt

Habitat conservation would be addressed through Section 7 of the Act, which requires Federal agencies to ensure that none of their activities are likely to jeopardize listed species. The only known Federal actions that may affect the giant kangaroo rat are rodent control operations, the issuance of leases for grazing and other agricultural purposes on Bureau of Land Management (BLM) holdings, and the issuance of permits for oil or natural gas exploration and development on lands administered by the BLM or the Department of Energy. No major conflicts are expected. The FWS already is conferring with both agencies to accommodate both a listing and energy development.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 1 (address on page 2), by October 15, 1985.

Valley Spring Reservoir. The plant was not relocated there, as all collections made at the reservoir were later verified to be *E. castrense*. Earlier collections thought to be *E. racemosum* that were made at Kesterson National Wildlife Refuge (NWR) have been correctly identified as *E. vaseyi*. The delta coyote-thistle may now be extinct.

Region 2—Excellent food and water conditions have made 1985 another bumper year for whooping crane (*Grus americana*) production at Canada's Wood Buffalo National Park. There were 28 nests in the park and 16 unusually large chicks were banded. Allowing for some natural losses, more than 95 whoopers are expected to arrive at Aransas NWR this fall.

At Grays Lake NWR in Idaho, 20 chicks were hatched by foster parent sandhill

cranes (*Grus canadensis*). Twelve of these were still surviving in early August, and 10 were captured briefly for leg banding. Water and food conditions are marginal at Grays Lake, due to the drought experienced by the northern Rocky Mountain States. These whooping cranes will begin their migration to Bosque del Apache NWR in New Mexico about mid-September. Approximately 30 adult and subadult whoopers are expected to join this year's chicks in southward migration to New Mexico and Mexico.

On July 24, 1985, the final rule was published determining "experimental population" status for certain reintroduced populations of Colorado squawfish (*Ptychocheilus lucius*) and woundfin (*Plagopterus argentissimus*). Section 10(j) of the Endangered Species Act authorizes experimental populations of endangered species to be treated with more flexibility in the management and recovery of these species. Under this new designation, 296 Colorado squawfish were released into the Verde River near Perkinsville, Arizona, on August 26, and 30,000 squawfish fry were placed into the Salt River on August 28. (See feature story in next month's BULLETIN.) Reintroductions of the squawfish in Arizona will continue under the experimental designation for up to the next 10 years in an effort to reestablish this species into parts of its historical range.

A survey of the black-capped vireo (*Vireo atricapillus*) in Oklahoma reports a decline of this Category 2 listing candidate, with an estimated 100 adults remaining. The black-capped vireo, once a locally common species in Oklahoma, is now found in small areas in southwest Canadian County, the Wichita Mountains NWR, and in north central Blaine County, Oklahoma. Decline of this bird is attributed to almost 100 percent nest parasitism by the brown-headed cowbird (*Molothrus ater*). Surveys of the black-capped vireo in Texas were also conducted, but no results have yet been reported. Cowbird trapping in Texas and Oklahoma was found to be effective in reducing parasitism of black-capped vireo nests by 40 to 100 percent.

The ESA Section 7 biological opinion for Cliff Dam, a proposed dam on the Verde River and a part of the Central Arizona Project, was issued on August 15, 1985. If constructed, Cliff Dam will flood one of the 15 bald eagle nests found along the Salt and Verde Rivers that produced 2 of the 26 eaglets fledged in Arizona this year. The jeopardy opinion under Section 7 listed several "reasonable and prudent alternatives," including: (1) assuring water flows in the Salt and Verde Rivers to provide forage fish for the

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Rail Census Locations

1984

1985

Carpinteria Marsh	26	7 (all males)
Mugu Lagoon	3	7
Anaheim Bay	24	11
Upper Newport Bay	112	87
San Joaquin Reserve Marsh	1	2
San Joaquin Carlson Road	2	0
Santa Margarita	2	1
Guajome Lake Marsh	2	0
Aqua Hedioda Lagoon	6	1
San Elijo Lagoon	10	1 (male)
Kendall-Frost Reserve	24	17
San Diego Flood Control Channel	2	1
Paradise Creek	1	0
Sweetwater Marsh	14	3
E St. Marsh	2	2
F St. Marsh	1	0
Otay River Marsh	5	1
South Bay Marine Reserve	2	1
Tijuana Marsh	38	0

Totals

Locations: 1984 = 19
1985 = 14

277

142

nesting eagles; (2) establishing eagle management areas along both rivers to protect the riparian habitat that these birds need; and (3) providing funds to study movement of these eagles via radiotelemetry.

Construction of Cliff Dam would destroy the Cliff nest, forcing this pair of bald eagles to move. However, the alternatives outlined by the FWS could be expected to provide for continued habitat for all central Arizona eagles. It is hoped that the Cliff bald eagles would select another site along protected streams.

Region 4—On June 18, 1985, representatives of the FWS, COE, National Park Service (NPS), Florida Game and Fresh Water Fish Commission, South Florida Water Management District (SFWMD), University of Florida, University of Michigan, Florida Cooperative Fish and Wildlife Research Unit, and the Florida Audubon Society met in Jacksonville, Florida, to discuss recent snail kite (*Rostrhamus sociabilis plumbeus*) studies and management activities. The biologists discussed the COE's plans to initiate a snail kite monitoring program in conjunction with COE's experimental water delivery program in south Florida, which will release water into Everglades National Park in order to restore the natural flow. The restoration program is based on a rainfall runoff design. The water will be supplied from a Water Conservation Area that is in snail kite Critical Habitat and also in one of the species' main nesting areas. The snail kite and its food source, the apple snail (*Pomacea paludosa*), will also be monitored during this study, which will be funded by the COE and the SFWMD.

Amphianthus pusillus (little amphianthus), a Category 2 listing candidate, is a diminutive annual plant restricted to vernal pools on granite outcrops. This species primarily occurs in Georgia, with peripheral populations in Alabama and South Carolina. Recent status survey work in Alabama under FWS contract with the Alabama Natural Heritage Program revealed only three populations after an extensive search of suitable habitat in that State. These populations are threatened with habitat destruction by off-road vehicle use, quarrying, and trash dumping. Additional information will be obtained on its status in Georgia and South Carolina, and a status review will be undertaken by the Jackson, Mississippi, Field Office to determine if a proposed listing rule is warranted.

On June 28, 1985, staff members from the Jacksonville, Florida, Endangered Species Field Office met with personnel from the Florida Natural Areas Inventory, Florida Game and Fresh Water Fish Commission, Florida Army National Guard (FLARNG), and a forestry

consultant at the FLARNG Camp Blanding facility in northeast Florida to discuss the status and management of one of the three remaining disjunct populations of Chapman rhododendron (*Rhododendron chapmanii*). At the Camp Blanding meeting, the development of a site management plan was discussed in detail.

The FLARNG and the FWS have a Conservation Agreement for the Endangered Chapman rhododendron. The FWS plans to provide technical assistance to the FLARNG for development of a management plan through the Florida Natural Areas Inventory.

Region 5—Approximately 60 bald eagles were hacked into the wild during mid-August in the States of Massachusetts, New Jersey, New York, and Pennsylvania.

Existing nesting habitat of the Endangered Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*) on Massasoit NWR in Plymouth County, Massachusetts, was expanded and improved through clearing of brush and herbaceous vegetation.

A jeopardy opinion on the use of the herbicide Picoloram was recently forwarded to the EPA. Alternatives to preclude jeopardy require certified applicators to contact the FWS if Picoloram is to be used in certain counties within the Northeast where numerous Endangered plants may be affected.

Region 7—Peregrine falcon surveys in interior and northern Alaska reveal continued improvement in the status of the region's two listed subspecies (*Falco peregrinus anatum* and *F. p. tundrius*). Cliff habitat along more than 2,500 miles of rivers were surveyed this summer as part of a cooperative effort by the FWS, Bureau of Land Management, NPS, private consultants, and several volunteers. Populations along most of the major rivers in Alaska have been fairly stable for the past few years, and surveys in 1985 of some of the smaller drainages and tributaries revealed that these areas are being reoccupied as well. One major river in interior Alaska, the Tanana, is the exception. It has remained at 50 percent of its historical level since the late 1970's. High pesticide levels appear to be the reason that this population has not shown the recovery seen in other areas.

A total of 139 pairs and 261 peregrine young were observed this year, and over 200 young were banded. Productivity in interior Alaska may have been affected by a late spring but, in general, was comparable with past years.

Polystichum aleuticum, currently a Category 2 listing candidate, is probably the rarest plant in Alaska, and is known origi-

nally from only two islands in the Aleutian Island chain. Recent efforts to rediscover this diminutive fern in the wild have been unsuccessful. *P. aleuticum* was probably never abundant, and introduced caribou and reindeer may have contributed to its current rare status.

Region 8—Beginning with this issue, the Regional Briefs section will also include activities reported by the Fish and Wildlife Service's nationwide research program, which is referred to collectively as Region 8.

Biologists at the Patuxent Wildlife Research Center's (PWRC) California Field Station, the Condor Research Center, recently captured three wild California condors (*Gymnogyps californianus*) for inclusion in the captive breeding program. The first, a subadult male, was captured with a cannon net on June 25, 1985, and taken to the San Diego Wild Animal Park. The second, an adult female, was trapped by biologists using a pit trap on August 7 and transported to the San Diego Zoo as a potential mate for the male. The two birds had been observed courting in the wild earlier this year, and were thought to have formed a pair bond. The third, captured on September 6, was a nonradioed adult female of unknown parentage. This bird was taken to the Los Angeles Zoo to serve as a potential mate for Topa Topa, the adult male condor that has been in captivity for 18 years.

Trapping of three condors for captive breeding was authorized in May 1985 after extensive surveys, combined with the known death of one male condor, indicated that five individuals had been lost to unknown factors since the 1984 census. Twenty-one condors, including the three birds trapped this year and two chicks that hatched in captivity from wild-produced eggs, are maintained currently at the San Diego Wild Animal Park and Los Angeles Zoo.

Biologists from PWRC's Southeast Field Station (Athens, Georgia) located 11 Kirtland's warblers (*Dendroica kirtlandii*) on their wintering grounds in the Caribbean during January–April 1985. They were generally sighted in low coppice growth with concentrations of other warblers in the Bahamas, British West Indies, Dominican Republic, and Turks and Caicos Islands. One Kirtland's warbler that was banded in this study recently was sighted on the breeding grounds in Michigan.

In 1985, a record of 12 Endangered Puerto Rican parrot (*Amazona vittata*) chicks fledged from nests in the Caribbean National Forest, the only site where the species exists in the wild. Seven of the chicks were produced by the five

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Regional Briefs

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breeding pairs in the wild; five other chicks were produced by captive pairs and fostered into wild nests. Three chicks, including one wild-produced and two captive-produced birds, were fitted with radio transmitters shortly before fledging. Biologists are monitoring their movements and activities to assist in determining causes of mortality.

The captive flocks of Endangered cranes at the main PWRC facility in Laurel, Maryland, produced 13 whooping crane (*Grus americana*) and 28 Mississippi sandhill crane (*Grus canadensis pulla*) eggs during the 1985 breeding season. Seven whooping crane eggs hatched, and six chicks were reared to fledging. Mississippi sandhill crane hatching success was even higher—20 of 23 potentially fertile eggs hatched. Sixteen young survived, and one fertile egg was transferred to the Mississippi Sandhill Crane NWR. In addition to the birds produced by the PWRC flock, one Mississippi sandhill crane chick and one whooping crane chick survived from eggs received from the refuge and Wood Buffalo National Park in Canada, respectively.

The captive flock at PWRC now consists of 38 whooping cranes and 42 Mississippi sandhill cranes. Over 200 sandhill cranes of nonendangered subspecies also are maintained at PWRC for research purposes.

With the recent acquisition and establishment of the Buenos Aires NWR south of Tucson, Arizona, masked bobwhite (*Colinus virginianus ridgwayi*) are being released to reestablish this Endangered bird in the wild. On August 6, 1985, the first shipment of 83 birds arrived from the captive-propagation flock at PWRC and

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	19	234	4	0	22	304	23
Birds	60	13	144	3	1	0	221	54
Reptiles	8	6	60	8	4	13	99	16
Amphibians	5	0	8	3	0	0	16	6
Fishes	34	4	11	18	3	0	70	38
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	9
Plants	79	5	1	23	2	2	112	42
TOTAL	248	47	461	70	10	37	873	215**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 181

Number of species currently proposed for listing: 22 animals
29 plants

Number of Species with Critical Habitats determined: 87

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

September 3, 1985

additional shipments of up to 180 birds per week were scheduled to be sent over the next several weeks. Two hundred masked bobwhites have already been released, and an anticipated total of

1,200–1,500 will be released this year. Since habitat on the refuge is in excellent condition due to high levels of rainfall, biologists are hopeful that from 100 to 200 birds will be breeding there next summer.

Recovery Plan Update

On August 9, 1985, a recovery plan for the Endangered smoky madtom (*Noturus baileyi*), a rare species of catfish native to eastern Tennessee, was approved. Copies of recovery plans become available for purchase about 6 months from their

date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

September 1985

Vol. X No. 9

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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New Notice Identifies Vertebrate Listing Candidates

In the September 18, 1985, *Federal Register*, the Fish and Wildlife Service (FWS) issued a "Review of Vertebrate Wildlife," replacing and updating an earlier version that appeared in 1982. The main purpose of the new notice is to identify those native U.S. vertebrate taxa—fish, amphibians, reptiles, birds, and mammals—that are considered candidates for possible addition to the Federal List of Endangered and Threatened Wildlife, and to request comments and information that may assist in determining whether or not to actually propose such addition.

The identified animals are placed in one of three categories that reflect their biological status:

Category 1 comprises taxa for which the FWS currently has substantial information on hand to support the biological appropriateness of proposing to list as Endangered or Threatened.

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PUBLIC DOCUMENTS
DEPOSITORY ITEM

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The golden-cheeked warbler (*Dendroica chrysoparia*) is one of the 519 vertebrate taxa identified as candidates for future listing.

Photo by Don Bleitz

Protection Recommended for Three Plants

The Fish and Wildlife Service (FWS) proposed during September to list three plants as Endangered. All are restricted in range, and are thought to be vulnerable to extinction from habitat loss and other factors. If the listing proposals are made final, Endangered Species Act protection will be extended to the following plants:

Eriogonum ovalifolium var. *williamsiae*

Otherwise known as the Steamboat buckwheat, *Eriogonum ovalifolium* var. *williamsiae* is known only from the vicinity of Steamboat Hot Springs in Washoe County, Nevada. It grows there on a loose, gravelly, sandy-clay soil derived from a terrace of hot spring deposits. Although the plant is locally common, with a total population of 10,000-15,000 individuals, it is concentrated in several colonies on less than 100 acres (40.5 ha) of land.

The plant is a low growing perennial with small, oval, greenish-white leaves that are densely arranged in tight rosettes. It frequently forms large mats. The small flowers are white, often with a pink midrib on each sepal, and are clustered at the ends of erect stems.

The plant has been collected only from around Steamboat Hot Springs, but it is thought to have been more widespread in the past. Development activities in the area probably contributed to its decline. Due to its restricted range, the buckwheat is vulnerable to possible extinction from further habitat degradation.

Roads have been constructed through most of the Steamboat buckwheat colonies, and off-road vehicle (ORV) travel has further disturbed the habitat and directly destroyed plants. The BLM gave some protection to a portion of the habitat by designating the main terrace, with its active geothermal characteristics, as an Area of Critical Environmental Concern. Although the BLM fenced the area

on three sides and posted it as closed to motor vehicles, ORVs still enter through the unfenced side. The Steamboat buckwheat, having adapted to its unusual habitat, is sensitive to variations in moisture, including the kinds of changes that can result from the ORV use and from the refuse that has been dumped at some of the colonies. There also is the potential threat that drilling of geothermal test wells may alter the habitat's water regimes. Further causes for concern are development of a park on BLM land that is leased to the Washoe County Parks and Recreation Department, the planned commercial development on private land adjacent to one of the buckwheat colonies, and the possibility of mining in the immediate area.

In light of these problems, the Steamboat buckwheat was proposed for listing as an Endangered species (F.R. 9/12/85). Since its habitat is so restricted and accessible, the FWS decided that pinpointing the colonies with a Critical

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Regional Briefs

Coincidentally, the proposed ditch would have dissected one of only two known populations of Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*) in the San Francisco Bay area, a Category 2 listing candidate. However, the MAD agreed to reroute the ditch to avoid the population and to preclude public access, which under current conditions was resulting in significant trampling of the plant.

The SESO staff, in cooperation with the U.S. Forest Service and California Department of Fish and Game (CDFG), participated in a site investigation of the Silver King Creek watershed in Alpine County, California. The purpose of the trip was to develop a grazing plan with the grazing permittee that is compatible with recovery plan objectives for the Threatened Paiute cutthroat trout (*Salmo clarki seleniris*). (See related story in BULLETIN Vol. X No. 7.) A plan was developed that will remove cattle use from one tributary, defer the season of use in all other Paiute cutthroat trout habitats, reduce grazing intensity, and fence off all degraded riparian corridors. There was a consensus within the group that recovery plan objectives for fish numbers and habitat quality in the Silver King watershed will be met if the recommended plan is implemented.

The status of the Endangered San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*) has remained relatively stable since 1984. There have been 18 breeding attempts by 14 pairs, and 18 young fledged. Seven of the 18 breeding attempts failed, and, in six of these cases, predation is suspected. At least 2 breeding adults and over 20 young were lost to predators, which include cats and ravens.

The shrike population continues to be limited by predation and a lack of suitable nesting habitat. Feral goats have removed all suitable nesting habitat from about 50 percent of San Clemente Island and continue to degrade the remaining shrike nesting locations.

The SESO staff completed a survey of two plant species, *Phacelia ramiosissima* and *Cuscuta californica*, at the Los Angeles International Airport's El Segundo Dunes area. A report on the distribution of these plants on the dunes is being drafted. *P. ramiosissima* is the larval host plant for Henne's Eucosma moth (*Eucosma hennei*), and *C. californica* is the larval host plant for Lora Aborn's moth (*Lorita abornana*), two

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Endangered Species Program regional staffers have reported the following activities for the month of September:

Region 1—The Sacramento Endangered Species Office (SESO) staff

recently conducted an on-site investigation of a ditch proposed by the Masin-Sonoma Mosquito Abatement District (MAD) to improve drainage and eliminate a potential mosquito breeding source in a tidal marsh at Mill Valley.

U.S. Fish and Wildlife Service Washington, D.C. 20240

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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Seven Species Receive Protection

During September, three plants and four fishes were given final protection under the Endangered Species Act. These species, listed as Endangered or Threatened, are as follows:

Maguire Daisy (*Erigeron maguirei* var. *maguirei*)

The Maguire daisy is a small perennial that grows up to 5 inches (12.7 centimeters) tall and has leafy, hairy, stems. In mid-June, white to pinkish ray flowers surrounding a yellow center of disc flowers appear. Only five individual plants are currently known to exist, making the Maguire daisy one of the rarest taxa in the United States.

First discovered in 1940, the Maguire daisy appears to be extirpated at two of its three historically known sites. The few remaining plants occur only at the upper end of a sandstone canyon in Emery County, Utah, on land administered by the Bureau of Land Management (BLM). There are mineral claims for uranium, and oil and gas leases in this area, and surface disturbance associated with exploration or assessment of these claims and leases could easily cause the Maguire daisy to become extinct. Recreational motorcycle use of the nearby canyon bottom may also threaten the species' survival, as could grazing, although the daisy's current site appears to be less accessible to cattle than other areas where it was found previously.

On July 27, 1984, the FWS proposed to list the Maguire daisy as Endangered because of the severe threats to its existence (see story in BULLETIN Vol. IX No. 8). After a thorough evaluation of all available information, and after considering the species' extreme vulnerability due to the very low number of remaining plants, a decision was made on September 5, 1985, to list the species as Endangered.

Short's Goldenrod (*Solidago shortii*)

This member of the aster family, endemic to the State of Kentucky, grows to slightly less than 39 inches (one meter) tall and bears yellow flowers between mid-August and early November. It is found in cedar glades and openings in oak or hickory forests, in pastures, and along roadsides. Only five populations of *Solidago shortii* are now known to exist, all in portions of Robertson, Nicholas, and Fleming Counties. The largest of these populations, located within Blue Licks Battlefield State Park, occurs within a 1.5-acre area that has been dedicated as a nature preserve by the Kentucky Nature Pre-

serves Commission. The remaining four sites are located on private property.

All five populations of Short's goldenrod (approximately 2,300 individual plants) are being threatened by natural and human-induced habitat alterations, along with potential recreational activities. In light of the species' declining numbers, these threats prompted the FWS to propose listing *S. shortii* as Endangered on October 11, 1984 (see BULLETIN Vol. IX No. 11) and subsequently to approve the final rule (F.R. 9/5/85).

San Mateo Thornmint (*Acanthomintha obovata* ssp. *duttonii*)

The San Mateo thornmint is an annual herb of the mint family. It grows to about 4 to 7 inches (10 to 18 cm) in height and bears upright inflorescences with creamy white flowers that have a rose to purplish pigment in their lower notched lip. Only one small population of this species is known to survive, and is located at Edgewood County Park near Redwood City, California, in San Mateo County. This population of approximately 1,000 to 2,000 individuals grows on a grassy slope on soils derived from serpentine rock.

Historically, the San Mateo thornmint was found at scattered locations in San Mateo County, but most of these sites have been destroyed, presumably by urban development, road construction, and similar land uses. The single known remaining colony has been severely damaged by off-road vehicles (ORVs).

Although the existing plants still face threats from ORV use, damage has decreased since the site came under county ownership. Nevertheless, a proposed recreation plan is now being considered for Edgewood Park involving construction of an 18-hole golf course and facilities for day camps, picnic areas, and expanded hiking and equestrian trails. All of these proposed activities have the potential to further damage the last population of the thornmint, or even to cause its extinction.

On June 18, 1984, the FWS proposed to list the San Mateo thornmint as Endangered (see BULLETIN Vol. IX No. 7). The final rule protecting this imperiled species was published in the September 18, 1985, *Federal Register*.

Three White River Fishes

Three desert fishes that occur in remnant waters of the pluvial White River system in eastern Nevada have been listed as Endangered. Populations of all three are declining as a result of habitat destruction and the introduction of

exotic fishes. Proposed by the FWS as Endangered in May 1984 (see BULLETIN Vol. IX No. 6), the following three fishes will now receive final protection:

The **White River spinedace** (*Lepidomeda albivallis*) is one of six species belonging to a unique tribe of fishes that are noted for their adaptations to small, swiftwater desert streams. It is a relatively large species of *Lepidomeda*, often attaining a length of 4 to 5 inches (10 to 13 cm), and can be distinguished from other members of its genus by various physical characteristics, including distinctive body coloration.

In 1960, *L. albivallis* was present in large numbers throughout its range, but by 1979 it was considered rare. Five populations of this species have already been eliminated and the remaining two, found in the Lund and Flag Springs systems, have been altered by channelization and diversion structures, which were developed to make water available for residential and agricultural uses. Further channelization and diversion of the water supply could pose a continuing threat to the White River spinedace. Competition and predation from exotic species, such as guppies (*Poecilia reticulata*), mosquito fish (*Gambusia affinis*), and goldfish (*Carassius auratus*), also are serious problems for the native spinedace.

As part of the September 12, 1985, final rule, Critical Habitat was designated for the White River spinedace to include three sites in Nevada: Preston Big Spring and Lund Spring (both located in White Pine County) and Flag Springs (Nye County). Although outside the species current range, Preston Big Spring is included in the Critical Habitat designation because it is part of the spinedace's historical range and is considered essential for the species' recovery.

The **White River springfish** (*Crenichthys baileyi baileyi*) and **Hiko White River springfish** (*C. b. grandis*) are found in the Pahrangat Valley of Lincoln County, Nevada. The White River springfish is currently known to occur only in Ash Springs, and the Hiko White River springfish, extirpated from Hiko Springs, now exists as a single, small population of fewer than 100 in Crystal Springs.

Habitats occupied by these two subspecies have been extensively altered for irrigation and public recreation. These activities have changed the character of the aquatic environments by eliminating vegetation, diverting the entire flow of some streams into pipes or cement canals, and manipulating water within stream channels to facilitate irri-

(continued on next page)

Seven Species

(continued from previous page)

gation. Not only do these alterations reduce habitat for the two fishes, they lead to declines in populations of invertebrates that the fish use for food. The introduction of exotic species into the Pahrnagat Valley during the past 50 years has also contributed to reduced populations of the spring fishes through predation and competition for food and space.

The September 27, 1985, rule listing these two fishes as Endangered included a designation of Critical Habitat for each. Critical Habitat for the White River springfish includes Ash Springs and its associated outflow in Pahrnagat Valley. For the Hiko White River springfish, it includes Crystal and Hiko Springs and their associated open outflows, also in Pahrnagat Valley. These designated areas satisfy all known criteria for both subspecies' ecological, behavioral, and physiological requirements.

Approximately 0.1 acre of the designated Critical Habitat for the White River springfish is located on land administered by the BLM, which will be preparing a Habitat Management Plan and Recreational Management Plan for the area. These management plans are expected to be compatible with the Critical Habitat designation.

Warner Sucker (*Catostomus warnerensis*)

The Warner sucker, endemic to the streams and lakes of the Warner Basin in south-central Oregon, reaches a maximum length of about 20 inches (51 cm). It is part of a relict fauna isolated in waters remaining from a large Pleistocene lake that previously covered much of the basin floor. Historically, the

Warner sucker was very abundant, but now it is known to occur only in portions of Crump and Hart Lakes, the spillway canal north of Hart Lake, and portions of a few nearby creeks. Because of this species' decline, the FWS proposed to list the Warner sucker as Threatened on May 21, 1984 (see BULLETIN Vol. IX No. 6).

The conversion of stream flows into lakes by water diversion structures has significantly changed the Warner sucker's habitat, and prevents the stream-spawning sucker from reaching its spawning and rearing areas. In addition, channelization of streams and overgrazing have disturbed soils in the watershed and degraded streams even further through siltation of the gravel beds needed by the fish for spawning. The introduction of exotic fishes into the Warner Valley lakes has also contributed to the decline of *C. warnerensis*.

Critical Habitat for the Warner sucker has been designated for portions of the following streams in Lake County, Oregon: Twelvemile Creek, Twentymile Creek, Snyder Creek, Honey Creek, and parts of the spillway canal north of Hart Lake. A 50-foot riparian zone on each side of the streams was included to protect the quality of the stream ecosystem, and it is considered essential to the conservation of this species. Complete Critical Habitat descriptions and maps are included in the September 27, 1985, final listing rule.

Some of the area designated as Critical Habitat for the Warner sucker is under the jurisdiction of the BLM and the U.S. Forest Service. Development of habitat or forest management plans involving these two Federal agencies could require consultation with the FWS if their implementation may affect the species' survival.

Available Conservation Measures

As Endangered or Threatened species, each of these plants and fishes will

receive the protection authorized by the Endangered Species Act. Among the conservation measures provided to listed species are the increased recognition of their precarious status, the requirement for the FWS to develop and implement recovery plans, the possibility of Federal aid to State conservation programs, and prohibitions against certain practices.

The prohibitions, in part, make it illegal to engage in interstate or international trafficking in listed species without a permit. For the Endangered fishes, prohibitions against take without a permit are now in effect. In the case of the Warner sucker, which is listed as Threatened, the listing includes a special rule that allows for take of Threatened species as necessary and advisable for their conservation. Such taking of this species is allowed without a Federal permit if a State collection permit is obtained and all State wildlife regulations are satisfied. However, taking will be allowed only for scientific, propagation, educational, or other purposes consistent with the Endangered Species Act. Incidental catch of the Warner sucker by licensed anglers will not be subject to prosecution, as long as the fish are immediately returned to the water.

Under the Act, the rules for take of listed plants are different. It is unlawful to remove Endangered plants from only those lands that are under Federal jurisdiction. This protection, authorized by Section 9 of the Act, will extend to the Maguire daisy, since the site of its single remaining population is under BLM jurisdiction.

Section 7 of the Act requires Federal agencies to consult with the FWS to ensure that any actions they fund, authorize, or carry out will not jeopardize the survival of any listed animals or plants, or adversely modify their Critical Habitats. These Section 7 requirements apply even when Critical Habitat has not been designated.

Comment Period Reopened on Bay Checkerspot

The Fish and Wildlife Service (FWS) has published a notice (F.R. 9/13/85) reopening the public comment period on the pending proposal to list the bay checkerspot butterfly (*Euphydryas editha bayensis*) as Endangered and to designate its Critical Habitat. Additional comments and information regarding the status of this butterfly can be submitted to the Regional Director, Region 1 (address on BULLETIN page 2), until November 12, 1985. The new deadline for a final decision on the proposal is March 11, 1986.

The bay checkerspot has been reduced both in population size and geographical range. Of 16 colonies formerly known, 11 have recently become extirpated. Colonies were eliminated as a result of freeway construction, subdivision construction, the introduction of exotic plants, and livestock overgrazing coupled with drought. On September 11, 1984, the FWS proposed giving the butterfly and its habitat protection under the Endangered Species Act (story in BULLETIN Vol. IX No. 10.)

The original 60-day public comment period has now been extended or reo-

pened for the fourth time to allow for the submission of additional information and comments. Indications of substantial scientific disagreement about the status of the bay checkerspot and the threats it faces prompted the latest extension, which is authorized under Section 4(b)(6)(B)(i) of the Act. Before the new March 11, 1986, deadline for a decision on listing, a panel of FWS scientists will review all available data and furnish recommendations on whether or not to proceed with the proposed action.

Three Plants

(continued from page 1)

Habitat designation could make the buckwheat more vulnerable to vandalism and overcollecting. The habitat nevertheless would receive protection from adverse Federal activities under Section 7 of the Endangered Species Act. Currently, the only known Federal activity that may affect the species is the proposed recreational development on land leased from BLM. Development of such a recreation area would more likely include measures for protection of the buckwheat if the plant is listed. The BLM has already expressed a willingness to work with the public and the private landowner to develop conservation and management programs. Such programs might include the development of a cooperative agreement with the landowner or, possibly, a land exchange.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 1 (address on page 2), by November 12, 1985.

Cypressus abramsiana

Only five small populations of this tree, commonly known as the Santa Cruz cypress, are known to exist. Portions of each have been destroyed or are threatened by residential development, land clearing for agriculture, logging, and/or alteration of the natural fire cycles upon which the species depends. One of the populations also faces threats from oil and gas drilling. Accordingly, the FWS proposed listing *Cypressus abramsiana* as Endangered (F.R. 9/12/85).

C. abramsiana is an erect, coniferous tree that reaches approximately 34 feet (10 meters) in height and has a compact, symmetrical, pyramidal crown. The five known populations are found within a two-county area of the Santa Cruz Mountains. Four of the groves are in Santa Cruz County; the fifth is at Butano Ridge in San Mateo County, a portion of which is included in Pescadero Creek County Park. Except for the parkland, all of the sites are privately owned, and are subject to the threats mentioned earlier. For example, more than half of the habitat at the largest grove (at Bonny Doon, Santa Cruz County) could be lost to a proposed vineyard development.

Fire has an important role in the Santa Cruz cypress life-cycle. Areas where the cypress grows historically were subject to periodic wildfires, and the species depends on these fires occurring at natural intervals. Cypress trees are "obligate seeders"; that is, they do not resprout from stumps after a fire, and thus depend completely on seeds for post-fire regeneration. If fire breaks out at too short an interval, the new trees

may not yet be at seed-bearing age and the groves could be extirpated. Conversely, the absence of fire for too long a time apparently results in lowered reproductive capability and, therefore, a more vulnerable population.

The proposal to list the Santa Cruz cypress as an Endangered species did not identify Critical Habitat, since such a designation would publicize the exact locations of the groves and make them more vulnerable to vandalism. (The largest tree in the Bonny Doon population was cut down recently.) Even without a formal Critical Habitat designation, however, the Section 7 protection against jeopardy to listed species from Federal activities still applies. In the case of the Santa Cruz cypress, the only Federal action that could affect the species involves oil and gas production at Butano Ridge, since issuance of leases and approval of drilling are the responsibility of the BLM. If the cypress becomes listed and is likely to be affected by drilling, the BLM would be required to consult with the FWS on ways to avoid jeopardy.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 1 (address on page 2), by November 12, 1985.

Glaucocarpum suffrutescens

A member of the mustard family, *Glaucocarpum suffrutescens* (toad-flax cress) is the only species in its genus. It is endemic to shale barrens in the Uinta Basin of northeastern Utah, in or adjacent to the Hill Creek drainage in southern Uintah County and at the base of the Badland Cliffs in nearby Duchesne County. The eight known populations

total fewer than 1,900 individuals, and are in decline because of widespread habitat degradation. On September 5, 1985, the species was proposed for listing as Endangered.

G. suffrutescens survives with several other endemic plants on scattered knolls and benches of a calcareous shale that is strongly resistant to erosion. The sites resemble small, extremely dry desert islands surrounded by sagebrush or pinyon-juniper woodlands.

Most of the plants are on property administered by the Bureau of Land Management (BLM). Part of the largest *G. suffrutescens* population is on the Department of Energy's Naval Oil Shale Reserve No. II, where BLM is responsible for surface management; the remainder of the population is on the Uintah and Ouray Indian Reservation, which is owned by the Ute Indian Tribe. The other seven populations are on lands under BLM, Indian, State, or private ownership.

Since the discovery of *G. suffrutescens* 50 years ago, its habitat has been declining. In fact, the species has been extirpated from its type locality, probably due to heavy grazing and the removal of stone for use in building. Large, linear flagstones are, or were, common in the species' habitat, and populations appear denser and more vigorous where these tuff fragments or clasts, which are in great demand, have not been removed. An even greater threat to *G. suffrutescens* could result from energy development, unless the species' needs are adequately considered during project planning. Its entire range is underlain by oil shale, which is likely to be

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Photo by Larry England

Among the factors threatening *Glaucocarpum suffrutescens* has been habitat disturbance resulting from collection of flagstones around the plants for use in construction.

Three Plants

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mined when conditions become economically favorable.

The proposal to list *G. suffrutescens* as Endangered included a provision for designating Critical Habitat. Eight areas totalling 7,360 acres (2,980 hectares) within the Uinta Basin were identified. They include the species' entire range except for a small, newly discovered population in Duchesne County that has not yet been adequately mapped. The proposed Critical Habitats are remote, about 2.5 hours over dirt roads from the nearest town. A Critical Habitat designation would not necessarily prohibit any kind of activity, but it would require Federal agencies to ensure that their activities are not likely to adversely modify the Critical Habitat. Current management is not likely to be affected to any major extent.

Comments on the listing proposal are welcome, and should be sent to the Regional Director, Region 6 (address on BULLETIN page 2), by November 4, 1985.

* * *

Available Conservation Measures

If the listing proposals are made final, all four species and their habitats will receive the full protection authorized for plants under the Endangered Species Act. Among the available conservation measures are the prohibitions on interstate or international trafficking in Endangered plants without a permit and the requirement for the FWS to develop and implement plans for their recovery. Further, under Section 7 of the Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species or adversely modify their Critical Habitat.

Section 9 of the Act makes it illegal to "remove and reduce to possession" Endangered plants from lands under Federal jurisdiction, and this provision would apply to parts of the remaining *Glaucocarpum suffrutescens* and *Eriogonum ovalifolium* var. *williamsiae* populations. Federal aid to State wildlife agencies for their own endangered species programs is available (through Section 6 of the Act) if they have approved Endangered Species Cooperative Agreements with the FWS; to date, California is among the States with such an agreement for Endangered plants, and it could apply for funds to aid in *Cypripedium abramsiana* conservation if the species is listed.

The Snail Kite, an Imperiled Floridian

by Robin H. Fields
Jacksonville Endangered Species Field Station

The Florida snail kite, formerly known as the Everglade kite, is one of the State's most vulnerable species. Historically, this raptor occurred in areas throughout peninsular Florida, but widespread habitat modification reduced its range and numbers to the point that it was listed in 1967 as Endangered.

Slightly smaller than a red-shouldered hawk, snail kites are 15 to 18 inches (38 to 46 centimeters) in length and have an average wingspread of 45 inches (114 cm). Adult males are dark slate gray, while adult females are brown above with buff below. Both have a square tail with a white patch at the base, which from a distance resembles that of a marsh hawk. Females are slightly larger than males. Immature kites of both sexes resemble adult females except that their eyes are brown rather than red.

The snail kite's scientific name, *Rosthamus sociabilis plumbeus*, is derived from Latin terms that describe the kite's characteristics: *rostrum* meaning beak, *hamus* meaning hook, *sociabilis* meaning a sharer, and *plumbum* meaning lead (colored).

The Snail Kite and its Prey

This bird has the most specialized known eating habit of any raptor in the world. It uses the fine long hook on its distinctively decurved bill to remove snails from their whorled shells. After holding a shell in its talons until the snail begins to emerge, the kite spears the snail and pulls it the rest of the way out of the shell.

In Florida, the snail kite feeds almost exclusively on the apple snail (*Pomacea paludosa*), a freshwater mollusk that inhabits shallow open water areas within marshes. (There is some evidence to indicate that snail kites in Florida may

also feed infrequently on an introduced snail, *Pomacea bridgesi*.) A snail kite will hover over an apple snail and then capture it by extending feet and talons into the water. Some captures are initiated from a low perch.

Despite the critical importance of the apple snail as the food source for the Endangered kite, comparatively little is known of the apple snail's ecological relationship to south Florida's wetlands. When marshes begin to dry, apple snails burrow into the mud to aestivate. Their ability to survive through drought is essential, not only to themselves but to the kite. In the southern Everglades, work has been done to determine the impacts of various water conditions on apple snail production. Marshes in this area typically experience seasonal water level fluctuations, and are usually without surface water during the latter part of the dry season. There are years, however, when water remains through all seasons.

In an Everglades study by Dr. James A. Kushlan (1975), it seemed that higher snail populations were attained under more permanent high water conditions, in contrast to conditions in which surface water reaches low levels in dry seasons. There appears to be a differential survival of large snails through dry periods, and increased juvenile recruitment in constantly high water. Thus, the average snail size was greater under conditions of fluctuating water levels, although total snail numbers may be fewer than if water levels were constant. It can be concluded that marshes along more permanent water bodies such as canal edges, impoundments, and lake edges may have higher snail populations than the Everglades.

Snail Kite Distribution

Snail kites are gregarious and nomadic, and during mid-day often soar
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snail kite feeding its young

Photo by Paul W. Sykes, Jr.

Snail Kite

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to great heights on thermals. They will often nest in loose colonies. Some dispersal can be expected following the nesting season, and dispersal is very pronounced during and after droughts. When disturbed, kites often circle low several times before flying away.

Snail kites require freshwater marshes with a distant horizon and a low vegetative profile. Their preferred habitat consists of extensive areas of open surface water 4 feet (1.2 meter) deep or less, like that in sloughs, spikerush (*Eleocharis*) flats, or wet prairies that retain some water throughout most years. Such areas are usually found within a larger marsh of sawgrass (*Cladium jamaicensis*) or cattails (*Typha domingensis* and *T. latifolia*) with scattered shrubs or small trees that serve as perches and nesting sites.

The main nesting season is January through August, although nests have been found in every month. Kites generally nest in coastal-plain willow (*Salix caroliniana*). Kites will nest in cattails over water when preferred trees or shrubs are unavailable; however, these nests are usually unsuccessful because the cattails cannot support the weight of the nest. Their nests, usually constructed only 3 to 8 feet (0.9 to 2.4 m) above the water, are loose structures of dried sticks lined with fine green plant stems and leaves. The average clutch size is three. Renesting upon the loss of a nest is common; double brooding occurs when nesting begins early in the nesting season and snails are abundant.

Early snail kite population estimates are not available, but there were mentions of scattered populations of approximately 100 birds through the 1920's. In 1945, Alexander Sprunt, Jr., was the first to report that the kite was in serious trouble; he estimated that there were only 50 to 100 snail kites remaining. He had observed a steady decline at Lake Okeechobee and a total disappearance from the headwaters of the St. Johns River. The kite population has fluctuated dramatically, declining precipitously in years of drought. In recent years, the annual census has ranged from 65 in 1972 to 668 in 1984 (see chart). In the 1980's, a series of droughts caused serious declines in the population. Despite the December 1984 survey figure of 668 kites, south Florida's serious drought in spring 1985 may result once again in a drastically reduced snail kite population.

Habitat Modification

Snail kites once ranged over a wide expanse of habitat in peninsular Florida. Historically, more than one-fourth of the

peninsula was covered with surface water during much of the year. The single most important factor responsible for the snail kite decline in Florida has been the loss of suitable freshwater marsh habitat resulting from drainage.

From 1881 to 1894, a number of drainage projects were initiated, and since 1905, major construction projects have been undertaken intermittently. Widespread drainage has permanently lowered the water table as much as 4.9 feet (1.5 m) in parts of south Florida and up to 6.9 feet (2 m) in the headwaters of the St. Johns River. Vast expanses of freshwater marshes have been completely destroyed, and much of the remaining marsh has been modified to the extent that it is no longer suitable habitat for snail kites.

In the late 1940's, the U.S. Army Corps of Engineers began to develop the Central and Southern Florida Flood Control Project to control freshwater runoff from the Everglades. In 1949, the Central and Southern Florida Flood Control District, today known as the South Florida Water Management District, was created. Flow of water to the sea was controlled, and three conservation areas were created in the Everglades. These conservation areas are freshwater storage sites regulated by levees and canals. Creation of the conservation areas secondarily

benefited the snail kite population by flooding some or all of the area for several years. But the demands for fresh water for agricultural, municipal, and industrial uses are so great that there is not enough fresh water left to maintain large areas of flooded habitat suitable for kites on a long-term basis.

In addition, large areas of marsh have become infested with the exotic water hyacinth (*Eichhornia crassipes*), which forms dense mats of vegetation obscuring the marshes where snail kites hunt. The exotic Australian punk tree (*Melaleuca quinquenervia*) is also invading the native sawgrass (*Cladium*) prairies, completely changing the prairies to swamps that are unsuitable for kite use.

Characteristically, as cyclic droughts occur, snail kites disperse to the small isolated wetlands and canal systems surrounding the Everglades, particularly those to the north, that still have water. Even these critically important drought related habitats, however, are disappearing as they are drained for development.

End of part one. Next month's conclusion discusses snail kite protection under the Endangered Species Act, implementation of the recovery plan, and habitat management strategies.



Photo by Jean Takekawa

Annual Snail Kite Census Results for Florida 1969-1985

Year	Total Number Of Kites	Severe Droughts
1969	98	
1970	120	
1971	72	1971
1972	65	
1973	95	
1974	81	
1975	110	
1976	142	
1977	152	
1978	267	
1979	431	
1980	651	1981-1982
1981	109	
1982	312	
1983	437	
1984	668	
1985	(to be conducted)	1985

Development of U.S. Export Programs for Repetitious Trade in CITES Appendix II Species

by Ronald Singer
Federal Wildlife Permit Office

In 1973, representatives of 80 countries met in Washington, D.C., to develop the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which took effect on July 1, 1975, after the tenth nation signed the treaty. There are now 88 CITES member countries that control species listed on one of three CITES Appendices. Species included on any of the three Appendices are internationally traded and are a) threatened with extinction (Appendix I); b) may become so threatened (Appendix II); or c) are listed on Appendix III for protection within the country of origin. CITES-listed species are subject to certain trade regulations that include a permit requirement for imports, exports, and reexports.

CITES member countries are required to designate one or more Management Authorities (MA) to issue permits authorizing international trade for listed species and to communicate with other members and the Convention Secretariat on CITES matters. Member countries are also required to designate one or more Scientific Authorities (SA) to make scientific decisions on international trade impacts. In the United States, the U.S. Department of the Interior is both the MA and the SA. The Federal Wildlife Permit Office (FWPO) of the U.S. Fish and Wildlife Service (FWS) acts as the MA for the Department, and the FWS Office of Scientific Authority acts as the SA.

CITES specifies that, among other things, the MA may not issue an export permit for a wild specimen of a listed species until the SA has advised that such export will not be detrimental to the survival of the species. Once this advice has been given, the MA must be satisfied that the specimen being exported was legally obtained and that the specimen is being exported in accordance with CITES regulations.

The MA may also issue a Certificate of Artificial Propagation for plants or a Certificate of Captive Breeding for animals, when there is proof that the specimens being exported were produced by these methods. Normally, no SA finding of nondetriment to the species is required in order to issue such documentation.

While many CITES Appendix II species are native to the U.S., seven species in particular are exported from this country in significant quantities. These species are: Alaskan brown or grizzly bear (*Ursus arctos*), Alaskan gray wolf (*Canis lupus*), American alligator (*Alligator mississippiensis*), bobcat (*Lynx*

rufus), lynx (*Lynx canadensis*), river otter (*Lutra canadensis*), and American ginseng (*Panax quinquefolius*).

Developing an export program for these species that would satisfy CITES requirements involved the following considerations:

- Even though the export of these species from the U.S. is controlled by Federal law, it is FWS policy that individual States are the appropriate managers of resident native species. This is based on the broad trustee and policy powers of States to control and regulate the taking and possession of resident species within their boundaries.
- The SA decided that, for high-trade Appendix II species, it was more practical to develop "generic" findings for all exports of a particular species from the U.S. rather than multiple findings for each individual export. Also, permit applicants normally could not provide the information on which to make individual nondetriment findings
- The MA decided that the time required to process and grant multiple individual export permits for repetitious exports would be disruptive to the normal movement of these species in international commerce.

With these factors in mind, the SA decided to grant generic nondetriment findings for those States that have an adequate resource base to support export and to manage the species for continued survival.

The MA examined State wildlife management programs and found certain features common to all programs:

- harvest was usually controlled by an established taking season;
- hunters or trappers usually had to be licensed by the State;
- harvested animals had to be marked in some manner to identify the species, where and when it was taken, and the hunter or trapper; and
- the taker had to report the harvest of certain species to the State.

A working group of experts from the Federal and State governments was assembled by the FWS to determine what biological and management programs were needed to insure appropriate CITES export decisions.

In consideration of its own study findings and the working group recommendations, the MA decided that the U.S.

CITES animal export program should rely upon State-applied tags as adequate proof that a specimen has qualified for export. Since 1978, States seeking generic export approval for CITES-listed resident species have developed and managed an FWS-approved tagging program, and have laws mandating the tagging of all legally taken CITES-listed animals before the animals or their skins are moved from the State. Tagging skins prior to shipping them from the State of origin is necessary; once skins move in interstate commerce, are accumulated by dealers and exporters, and sold through various sales or auctions, it is virtually impossible to differentiate one unmarked skin from another.

The MA developed a standardized export tag and legend, and began ordering tags for export-approved States in 1982. This eased the tag ordering process for the individual States and, because of the quantity ordered, reduced the cost of tags to the States. Beginning in 1983, the MA decided to both order and pay for CITES export tags in order to eliminate this cost to the States. Once properly tagged, CITES animal species are exported through an FWS-designated port where CITES documents are checked, validated, and collected if necessary.

The attachment of a tag to an animal skin is a relatively simple and easy method of certifying a specimen for export. But how does one handle the export of plant material like roots of American ginseng? These roots are relatively small, and may number 100-300 per pound when dried and ready for export. With more than 700,000 pounds of dried ginseng roots exported each year, the total number of individual roots boggles the mind. After due consideration, the MA decided that, because most bulk agricultural products are sold by weight, a State export program and certification system reporting legal take, State of origin, and weight of roots would satisfy the export requirements mandated by CITES.

Actual export of the State-certified ginseng occurs through a U.S. Department of Agriculture-designated port, where the CITES export document, shipping waybill, State certificates of origin, and shipment contents are examined by Agriculture port inspectors. If the shipment is in order, the CITES export document is validated by the port inspector, and waybills and State documents are collected for return to the MA. The MA then reviews all documents and returns certificates to the State of issuance for final verification.

Restoring the Colorado Squawfish to Arizona Waters

by James Johnson, Albuquerque Regional Office

On August 26, 1985, Colorado squawfish (*Ptychocheilus lucius*) came back to Arizona. North America's largest minnow (there are records of specimens 6 feet long and 80 pounds in weight), squawfish were once so plentiful in Arizona waters that early settlers pitchforked them out of irrigation canals for fertilizer. Many of those same settlers referred squawfish as a food fish over the native trouts, and described the flesh as "white, flaky, and sweet."

Beginning in the early 1900's, dams on the Salt, Verde, Gila, and Colorado Rivers in Arizona began to alter riverine habitats. Changes in water temperatures, dewatering of many reaches, loss of flood flows, and the increase in non-native fish species may have been the factors that led to the decline of the squawfish. By the time the Colorado squawfish was listed as an Endangered species (1967), it had already been almost extirpated from Arizona. The last Colorado squawfish from the Gila River drainage was found in a tributary (the Salt River) above Roosevelt Lake in 1951, and the last one from any Arizona waters came from below Glen Canyon Dam in 1969.

Today, wild populations of squawfish survive only in parts of the upper Colorado River basin, especially in the Green and Colorado Rivers of Colorado and Utah. The Colorado Squawfish Recovery Plan, signed in 1979, called for reintroducing the species back into Arizona

waters. After extensive review, the Arizona Game and Fish Department recommended two areas for reintroduction: the Salt and Verde Rivers. Sections of these rivers still appear to contain suitable habitat. Brood fish were obtained from the Green River and artificial spawning efforts started at Willow Beach and Dexter National Fish Hatcheries (NFH).

In the late 1970's, the Fish and Wildlife Service (FWS) began to discuss the reintroduction of squawfish with land and resource managers in Arizona. Surprisingly strong opposition to reintroduction came from groups interested in further water development, and from grazing and mining interests within the watershed. The most common concern among these special interest groups was the possibility that the FWS might reintroduce an Endangered fish into waters from which it had been extirpated, and then use its presence to stop proposed or ongoing actions by invoking Section 7 of the Endangered Species Act, which bars Federal agencies from any actions likely to jeopardize listed species. Comments were also made that, once the fish had been reintroduced, the FWS could declare Critical Habitat in those streams, further blocking development.

In 1982, the Act was amended to include the category of "experimental populations." Two subcategories, "essential" and "non-essential," pro-

vided varying degrees of protection for reintroduced populations. (See story in BULLETIN Vol. IX No. 9.) Non-essential populations are those that are not vital to the survival or recovery of the species, and therefore are not subject to most Section 7 regulations. While regulations for the experimental population concept were developed in Washington, D.C., Region 2 geared up at Dexter NFH. The proposal to reintroduce Colorado squawfish into Arizona as a non-essential experimental population in the Salt and Verde Rivers was published on April 10, 1984. (See BULLETIN Vol. IX No. 5.) The final rule was published July 27, 1985, and took effect 30 days later.

On August 26, 1985, 296 squawfish were released into the Verde River near Perkinsville, Arizona. The fish were over 4 years old and ranged from 12 to 16 inches in length. Two days later, 200 one-year-old squawfish and 30,000 fry were placed into the Salt River. Releases of squawfish in Arizona will continue under the experimental designation for up to the next 10 years in an attempt to reestablish viable populations of this large, good-eating minnow back in its historical waters. The Arizona Game and Fish Department will monitor the success of the effort. The released squawfish, we hope, will prosper in the Salt and Verde Rivers and aid in the eventual recovery of this unique species.

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insects that are the subject of a listing petition recently received by the FWS.

On August 25, the CDFG invoked an emergency closure of the gill and trammel net fishery out to 20-fathoms between Cape San Martin and Point Piedras Blancas. This closure expands the area previously closed to gill and trammel net fishermen by an emergency order on January 27, 1985, and permanent legislation enacted on May 24, 1985. The new closure encompasses 17 miles of coastline and nearshore waters out to the 20-fathom contour.

The previous 15-fathom closure apparently did not eliminate the entanglement of southern sea otters (*Enhydra lutris nereis*) in gill and trammel nets. Since the 15-fathom closure went into effect, 10 of the Threatened otters have drowned in nets set legally outside 15-fathoms. Seven of the ten otters drowned off Ragged Point, the area now closed to gill and trammel net fishing out to 20-fathoms by the August 25 emer-

gency closure. The CDFG hopes that this latest closure will significantly reduce sea otter mortality.

The State of Hawaii's Division of Forestry and Wildlife has announced that it intends to move its Endangered species captive breeding project from Pohakuloa on the island of Hawai'i to Olinda on the island of Maui. The proximity of the Pohakuloa facility to U.S. Army ordnance and aircraft training areas may be having a detrimental effect on the behavior of breeding birds. It is hoped that modifications to a now unused prison at Olinda will be completed by this December so that captive Hawaiian crows or 'alala (*Corvus hawaiiensis*) can be moved there prior to their spring breeding season. Captive individuals of other Endangered species, such as the nene or Hawaiian goose (*Nesochen sandvicensis*), and the koloa-maoli or Hawaiian duck (*Anas wyvilliana*), will be moved subsequently.

The 1985 summer palila (*Loxioides bailleui*) count was conducted during

July 15-24 by FWS and Hawaii Division of Forestry and Wildlife staff members. Preliminary analyses resulted in a population estimate of 1,867 birds, plus or minus 676. This represents a 42-percent increase from the 1984-1985 winter estimate and an 8-percent decrease from summer 1984. Hopefully, this recent increase represents a real recovery from the all-time population low during winter 1984-1985.

Of the 23 whooping crane (*Grus americana*) eggs translocated to Grays Lake National Wildlife Refuge (NWR) in Idaho from the breeding grounds in Canada, 20 hatched and 3 were infertile. Eleven of the 20 chicks have been banded. Whether or not the remaining birds survived was not known by early October.

Region 2—Dr. Rod Drewien reported that the Rocky Mountain whoopers' fall staging activities were about 2 weeks earlier than normal. During such staging periods, the whoopers concentrate in grainland-wetland complexes with
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sandhill cranes (*Grus canadensis*), where they feed on waste grains that remain after harvest.

After several weeks on the staging areas, the whooping cranes begin their migration into the San Luis Valley of Colorado. The whoopers' early staging activities may be the consequence of the summer drought, hard frosts in mid-August that killed the insects used as food, and an early, cool fall. These cranes seldom migrate before October 1, but this year only five to six whoopers and several hundred sandhill cranes remained at Grays Lake NWR on that date.

A juvenile whooping crane that struck a powerline about 20 miles southeast of Grays Lake NWR was found on September 23. He was treated for several days in a veterinary clinic in Pocatello, Idaho, and then transferred to Patuxent Wildlife Research Center (PWRC) in Laurel, Maryland. The likelihood of recovery is slim due to severe leg and abdominal injuries.

Two other whooping cranes decided to migrate separately this fall, east of the Rockies. The first, which summered in western Wyoming near Danielsville, appeared near Hudson, Colorado, on September 10 and remained there through the month. Local landowners were contacted, and other steps were taken to ensure the bird's safety. The second whooper, which summered 15 to 20 miles from the first, was reported near Severance, Colorado, on September 24. It was using an area of about one square mile, consisting of three waterfowl hunting club leases. Approximately a 3-square mile area was closed informally to hunting through cooperation of the clubs and landowners for a period following the opening of the Canada goose (*Branta canadensis*) and sandhill crane hunting season, which began September 28. These two whoopers were only the second and third of the Grays Lake flock confirmed to be migrating east of the Rocky Mountains since the flock was established

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An aerial survey of whooping cranes conducted over part of the breeding grounds at Wood Buffalo National Park on September 20 by the Canadian Wildlife Service confirmed the survival of at least 15 of the 16 young-of-the-year birds banded there during mid-August. Early migrants had moved into Saskatchewan by the survey date.

* * *

Based on radio telemetry of an adult female ocelot (*Felis pardalis*) in early

September, a 2-week-old female ocelot kitten was located on the Laguna Atascosa NWR in south Texas. Linda Laack, a graduate student at Texas A&I University, discovered the "den" site containing the kitten as part of her ocelot ecological studies on the refuge. The den consisted of a barren earth depression under a bush in a very dense thorn forest. The kitten was examined and photographed, and appeared to be in good health. Radio telemetry data indicate that the mother is caring for the kitten. This is the first den site located and documented for this Endangered species. The kitten also represents the third generation of ocelots involved in this ongoing study.

* * *

One hundred and four individual plants of Knowlton's cactus (*Pediocactus knowltonii*) were reintroduced into the species' historic range in northwestern New Mexico in early September. In the wild, the species is known from only one location, where an estimated 7,000 plants grow in an area of less than 25 acres. The reintroduced plants were taken as cuttings from wild plants last spring and reared in a greenhouse until they had developed to the point that they could survive in the wild.

The reintroduced plants will be monitored carefully to determine if this is a valid recovery technique. The project is a cooperative effort between the FWS, the State of New Mexico, and The Nature Conservancy. The Bureau of Land Management just concluded a 2-year field survey of Knowlton cactus potential habitat and was unable to locate additional populations.

* * *

Release of masked bobwhites (*Colinus virginianus ridgwayi*) on Buenos Aires NWR appears to be going very well. Final acquisition of the property in southern Arizona was completed on August 1, 1985, and by mid-September, 363 masked bobwhites had been released. Fifty-three sterilized male Texas bobwhites, a non-endangered taxon, have adopted masked bobwhite chicks, but 14 rejected their foster offspring. The wild Texas birds teach their young wards something about survival, but cannot contaminate the masked bobwhite gene pool. Over 1,000 masked bobwhite chicks have been received from the PWRC; an estimated 2,500 masked bobwhites will be received in total and released by mid-October.

* * *

Region 3—Wildlife managers and researchers throughout the Midwest met in Ohio during the week of September 23 to discuss the management of endangered wildlife. This meeting of

endangered species program coordinators has taken place annually for the last 10 years. Agenda topics this year included the Endangered Species Act, bald eagle restoration, and nongame programs. The attendees also had an opportunity to exchange information on State programs. Region 3 States represented at the meeting included Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Also in attendance were representatives from Ontario, Canada, and the endangered species coordinator from New York State.

Winous Point Shooting Club, a managed hunting club on one of Lake Erie's prime marshes, hosted this year's meeting in cooperation with the Ohio Department of Natural Resources' Division of Wildlife and the FWS. The club has been a long-time supporter of endangered wildlife and nongame management.

* * *

Region 4—In two unrelated incidents, federally listed Endangered species were taken recently in Florida. The first case involved a commercial fisherman found with a butchered West Indian manatee (*Trichechus manatus*) calf in his boat on May 16, 1985, in the St. Lucie River. FWS Special Agents and Florida Marine Patrol officers conducted an investigation that led to the arrest of four men. All four were indicted on Federal charges of possessing and killing a manatee. Charges were dropped against three, but one man received a \$750 fine and one-year prison sentence. An initial plea bargain for probation was rejected after three previous fishing convictions were uncovered.

In the other incident, a Key West man was arrested after a road chase and was found to possess a dead Key deer (*Odocoileus virginianus clavium*). The dead animal, a pregnant doe, had been shot three times. Carrots and a .22-caliber rifle were also found in the truck. The Federal Government plans to press charges under the Endangered Species Act (and possibly the Lacey Act), and the State of Florida plans to charge the suspect for violation of State law.

* * *

On July 1, 1985, the Florida Department of Natural Resources (DNR) assumed responsibility for the Manatee Salvage Program from the FWS. The Florida DNR will initially operate the program with Federal support from Endangered Species Act (Section 6) funds. Personnel from Sea World of Florida and the University of Miami will cooperate with DNR biologists in salvage and necropsies.

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The Manatee Salvage Program has been, and continues to be, a crucial source of data for evaluating human impacts on manatees. Since 1974, 931 carcasses have been recovered. Approximately one-third of the deaths were found to be human-related; 210 of them were attributed to boat or barge collisions. Thus far, the 1985 mortality rate is similar to the 1984 rate, which resulted in the highest annual mortality documented (131).

The U.S. District Court for the District of Columbia has made a ruling concerning the propriety of cutting timber for southern pine beetle control in four wilderness areas—the Black Creek and Leaf Wilderness Areas in Desota National Forest, Mississippi; Caney Creek Wilderness Area in Quachita National Forest, Arkansas; and Kisatchie Hills Wilderness Area in Kisatchie National Forest, Louisiana. The Sierra Club sought a preliminary injunction based on alleged violations of the National Environmental Policy Act and the Endangered Species Act. The court recognized that cutting may be necessary to prevent harm to the red-cockaded woodpecker (*Picoides borealis*), and allowed that cutting could take place in wilderness areas for the sole purpose of preventing harm to this species, provided that it is done in strict accordance with the U.S. Forest Service wildlife habitat management manual. The FWS must also be notified in writing of the need for cutting in wilderness areas.

The results of field surveys and status reviews conducted by FWS biologists in Jackson, Mississippi, indicate that the ringed sawback turtle (*Graptemys oculifera*) warrants a listing proposal, while the yellow-blotched sawback (*G. flavimaculata*) does not. The ringed sawback is endemic to areas of the Pearl River and a tributary, the Bogue Chitto River. A listing proposal for this species is warranted due to threats from potential habitat modification expected to result from numerous projects that are authorized, planned, or proposed by the U.S. Army Corps of Engineers.

The yellow-blotched sawback turtle, endemic to the Pascagoula River system in Mississippi, was found abundantly in the river and its many bayous. No significant threats to this species surfaced during the status review.

Region 5—During September, the Region 5 Endangered Species office

staff was involved in revising recovery plans for three Endangered species: the Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*), the Maryland darter (*Etheostoma sellare*), and the Virginia round-leaf birch (*Betula uber*). These revised plans will more accurately identify the recovery needs of each of the three species, based on the most recently acquired biological data.

Region 7—With a small population of Aleutian Canada geese (*Branta canadensis leucopareia*) now established on Agattu Island, transplant efforts are being directed to Amchitka Island. During August, the staff of the Aleutian Islands Unit NWR successfully transplanted 124 geese from Buldir Island to Amchitka. Annual transplants to Amchitka of 100 to 150 geese will continue until a self-sustaining population is established. Based on efforts to reestablish geese on Agattu, at least three transplants to Amchitka will be needed.

The FWS and cooperating agencies in Alaska have banded more than 1,200 peregrine falcons (*Falco peregrinus*) since the initiation of a comprehensive banding program in 1979. Band returns from Mexico, El Salvador, Brazil, and Argentina, and from the States of Washington, Texas, Louisiana, Virginia, and Georgia, have provided valuable insight into the migration and wintering habits of peregrines nesting in Alaska. The most recent return is the first from western South America: a peregrine banded as a nestling on Alaska's Charlie River in 1984 was shot in Ecuador in March 1985.

Region 8 (Research)—Over the past year and a half, personnel from the Western Energy and Land Use Team (WELUT) have been helping to evaluate the consequences of water development activities on Endangered fish habitat in the Upper Colorado River Basin. The Colorado squawfish (*Ptychocheilus lucius*) and humpback chub (*Gila cypha*) are the species of principal concern. Their habitat has been significantly altered by the construction of more than 20 major dams in the basin, and water development activities continue to be proposed to support urban expansion, irrigation, and electrical power generation.

The FWS has been charged to develop river flow and temperature recommendations for important stream reaches throughout the basin, primarily the Colorado and Green Rivers and their major tributaries. These recommendations must provide for the maintenance of Endangered fish habitat and must operate within the constraints of water

supply, future water demands, and existing legal requirements. Members of the Instream Flow Group at WELUT have been assisting in most phases of the process for establishing these flow and temperature recommendations. Much of the evaluation revolves around the use of "Network Habitat Analysis" techniques, which interrelate the effects that alternative water management scenarios have on flows, temperatures, and the components of aquatic microhabitat, such as the water's depth and velocity.

Results of the analysis will be forwarded to the interagency Colorado River Coordinating Committee, chaired by the FWS. The results will be used to develop biologically based, legally defensible recommendations for water management in the basin.

The FWS Office of Habitat Resources has provided \$200,000 to complete fencing on the upper Hanawi watershed on Maui. The watershed contains nearly 25 percent of the habitat of the critically Endangered po'ouli (*Melamprosops phaeosoma*) and is also the central point of distribution of the Endangered Maui parrotbill (*Pseudonestor xanthophrys*) and 'akohekohe or crested honeycreeper (*Palmeria dolei*). The fencing project will exclude non-native pigs from an enclosed area and allow PWRC biologists to study the response of native birds and vegetation as part of ongoing research in the Hawaiian Islands.

One of three Puerto Rican parrot (*Amazona vittata*) chicks that are being radio-monitored by PWRC biologists to determine post-fledging movements and survival was found dead 5 weeks after fledging. Since fledging, this parrot, along with its two nest mates, had remained within the nest valley, generally within 200 to 400 meters from the nest cavity. The radio transmitter, some feathers, and a few bone fragments were recovered under a tree root mass, apparently where a scavenger had carried the body before consuming it. Because of the scant remains, cause of death could not be positively determined.

A karyotyping technique to determine the sex of Endangered whooping cranes is now being used at the PWRC. The technique, a modification of the procedure developed at the San Diego Zoo for sexing California condors, involves identification of the sex chromosomes in avian lymphocytes. In 1985, 16 whooping cranes and 15 Mississippi sandhill cranes (*Grus canadensis pulla*) were sexed using this technique. This information will be used in the pairing of subadult cranes for captive propagation.

Recovery Plan Update

The following recovery plans were recently approved: *San Francisco Garter Snake Recovery Plan* (9/11/85); *Coachella Valley Fringed Lizard Recovery Plan* (9/11/85); *Delta Green Ground Beetle/Solano Grass Recovery Plan* (9/11/85); and *Leon Springs Pupfish Recovery Plan* (8/14/85).

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

New Notice

(continued from page 1)

Category 2 comprises taxa for which information now in possession of the FWS indicates that proposing to list is possibly appropriate, but for which conclusive data on biological vulnerability and threats to their survival are not currently available to support proposed rules. Further research and field study may be needed to ascertain the status of the taxa in Category 2, and it is likely that many will be found to not warrant listing.

Category 3 comprises taxa that were once being considered for listing, but that are not currently receiving such consideration because they are thought to be extinct (Category 3A), taxonomically invalid (Category 3B), or no longer subject to identifiable threats (Category 3C).

A total of 594 species, subspecies, and vertebrate populations are covered by the review, and are categorized as shown in the following table:

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	19	234	4	0	22	304	23
Birds	60	13	141	3	1	0	218	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	19	3	0	74	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	10
Plants	82	5	1	23	2	2	115	43
TOTAL	254	47	458	71	10	37	877	220**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 185

Number of species currently proposed for listing: 18 animals
29 plants

Number of Species with Critical Habitats determined: 91

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

September 30, 1985

The notice requests information concerning the status, taxonomy, and distribution of the identified taxa; recommendations concerning possible designation of Critical Habitat; documentation of threats; and nominations for additional candidates. Information

and comments may be sent to the Director (OES), U.S. Fish and Wildlife Service, Washington, D.C. 20240. Copies of the notice may be obtained by writing to this same address. The list of candidate taxa will be amended periodically to reflect new information.

	Category 1	Category 2	Category 3	Total
Fish	17	111	20	148
Amphibians	1	52	9	62
Reptiles	4	49	19	72
Birds	8	44	13	65
Mammals	5	224	18	247
Total	35	480	79	594

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior. U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Revised Plant Notice

The Fish and Wildlife Service (FWS) has published an updated and revised notice identifying the vascular plant taxa native to the United States that are being reviewed for possible addition to the Federal List of Endangered and Threatened Plants (F.R. 9/30/85). A major purpose of the notice is to solicit additional comments on the status of these plants and the threats they face in order to assist in determining whether or not to propose listing them under the Endangered Species Act.

The identified plants are placed into one of three categories:

Category 1 comprises those plants for which the FWS has substantial data on biological vulnerability and threats to support a proposal to list them as Endangered or Threatened. Currently, there are 894 taxa in this category. Development and publication of proposed listing rules on these plants are anticipated, but, because of the large number, could take years.

Category 2 contains taxa for which the available information indicates that proposing to list them as Endangered or Threatened is *possibly* appropriate, but for which conclusive data on biological vulnerability and threats sufficient to prepare listing proposals are not currently known to the FWS. Further study will be necessary to ascertain the status of the

1,623 taxa in Category 2. It is likely that some will be found to be not in need of Endangered Species Act protection, while others could be determined in greater peril of extinction than some taxa in Category 1.

Those taxa in Categories 1 and 2 are considered by the FWS as candidates for future listing. Once again, Hawaii has the largest number of candidate plants (747), followed by California (648), Florida (176), and Texas (124). Categories 1 and 2 also contain some taxa whose status in the recent past is known, but that may already be extinct in the wild.

Category 3 is made up of 1,414 taxa that once were being considered for listing as Endangered or Threatened, but that are no longer under consideration. There are three subcategories: 3A—60 taxa for which the FWS has persuasive evidence of extinction; 3B—310 taxa that, on the basis of current taxonomic understanding, do not meet the Endangered Species Act's definition of a "species"; and 3C—the 1,044 taxa that have been found to be widespread and/or not subject to any identifiable threat.

Until they are listed as Endangered or Threatened, none of the plant candidates receive any kind of legal protection; however, it is the policy of the FWS to advise other agencies of these candidates when inquiries are made on spe-

(continued on page 8)



Photo by Charles Sheviak

The fringed prairie orchid (Platanthera leucophaea), which faces threats from developers and collectors, is one of 2,517 plant taxa considered candidates for listing.

Eight Foreign Mammals Proposed for Listing as Endangered

Eight mammals from various parts of the world have been proposed by the FWS for listing as Endangered under the U.S. Endangered Species Act (10/25/85). All occupy very restricted ranges, and are jeopardized by habitat disruption and/or direct killing by humans. Unless they receive adequate protection, the following foreign mammals could become extinct:

- Baluchistan bear (*Ursus thibetanus gedrosianus*)—A small subspecies of the Asiatic black bear, this animal is generally reddish brown in color. Originally, it occurred throughout the mountainous parts of Pakistan, but most of its forest habitat has been cut down for agriculture. Farmers that have moved into these cleared areas regard the bear as ver-

min and kill it whenever present. Consequently, it now is restricted to a relatively small part of south-central Pakistan, although a few may survive in adjacent sections of Iran. Biologists estimate that fewer than 200 remain.

- large-eared hutia (*Capromys auritus*)—Relatively large for a rodent, measuring approximately 30 centimeters (12 inches) in body length, this animal has long, harsh brown fur. It is arboreal, and occurs only in a mangrove swamp on Cayo Frago, an island off north-central Cuba. The large-eared hutia was not even known to science until 1970, and it is thought to be rare. Killing of this animal by fishermen and others who visit the island for

food is considered the main threat to the species' survival. Hutias are driven into the water where they are slow and clumsy, and thus are easily captured.

- little earth hutia (*C. sanfelipensis*)—Similar in appearance to the large-eared hutia, the little earth hutia also is threatened by take for human consumption. It is found in an area of low, dense vegetation on Cayo Juan Garcia off southwestern Cuba, and may also occur on nearby Cayo Real. This species is considered very rare, and no individuals were found on a 1980 expedition to Cayo Juan Garcia.
- dwarf hutia (*C. nana*)—Somewhat smaller than the above rodents, the

(continued on page 6)

worth of habitat that will become part of the Coachella Valley Preserve (CVP). The management agreement for the CVP is nearing completion and should be signed in the near future. Field work on lizard population levels is proceeding, and the first year's data indicate healthy populations.

A recently completed rangewide trapping survey (August 1984-August 1985) for the Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*) indicated that only one active population site exists: the Bayview area of Los Osos, California. After more than 4,800 trap-nights, the survey confirmed the species at only one other site when an adult male was captured near Buckskin Drive. The Buckskin site lies approximately 1½ to 2 miles east of the other. The two sites are separated by several blocks of dense housing, a shopping center, and many small business developments.

Results of this survey further corroborate that the Bayview area supports the largest and perhaps only remaining population of the Morro Bay kangaroo rat within its historical range. The single adult male captured at Buckskin is thought to be a lone individual moving through remnant habitat; however, it is still possible that small, transient populations exist in other remnant areas.

The number of known peregrine falcon (*Falco peregrinus*) nesting pairs in California increased from 64 in 1984 to 77 in 1985. Sixty-two of these pairs produced 106 young (29 captive-reared nestlings; 77 fledged naturally). Twenty additional falcons were released from hack sites, and two fledged that were cross-fostered to prairie falcons (*Falco mexicanus*). A total of 128 peregrine falcons were fledged this year in California, and this population continues to recover, although pesticide-induced eggshell thinning remains a chronic problem.

The FWS has entered into a Memorandum of Understanding (MOU) with the Los Angeles Department of Airports and the California Department of Fish and Game to protect and manage a preserve for the El Segundo blue butterfly (*Euphilotes battoides allyni*) at the remnant sand dunes on the west end of the Los Angeles International Airport. An existing 80-acre parcel inhabited by the El Segundo blue, plus 35 to 40 adjacent acres of restorable habitat, will be protected under the MOU. The remnant dunes also provide habitat for at least two other rare Lepidoptera that would benefit from the El Segundo blue butterfly preserve: the Lora Aborn's moth (*Lorita abornana*) and Henne's Eucosma moth (*Eucosma hennei*). Until a 1984 survey, neither moth had been observed for nearly 40 years.

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of October:

Region 1—The draft Environmental Impact Statement for the issuance of an Endangered Species Act Section 10(a)

permit for the Coachella Valley fringe-toed lizard (*Uma inornata*) was sent out recently by the Fish and Wildlife Service (FWS) for review, and a public hearing to solicit comments on the document was held in Palm Springs, California. In mid-August, the FWS acquired \$4.7 million

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. Region 2: Arizona, New Mexico, Oklahoma, and Texas. Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. Region 5: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. Region 7: Alaska.

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Endangered Species Act Protection Proposed for Four Plants

The Fish and Wildlife Service (FWS) recently published proposals to add the following four species of plants to the U.S. List of Endangered and Threatened Wildlife and Plants:

Three Florida Shrubs

Protection was recommended on November 1, 1985, for three species of shrubs in the custard-apple family (Annonaceae). The **beautiful pawpaw** (*Deeringothamnus pulchellus*) and **Rugel's pawpaw** (*D. rugelii*), the only species in their genus, were proposed for listing as Endangered, while the **four-petal pawpaw** (*Asimina tetramera*) was proposed as Threatened. All three species are restricted to very small areas of the Florida peninsula, where they are jeopardized by habitat degradation and successional changes in the surrounding vegetation.

Both *Deeringothamnus* species inhabit poorly drained slash pine/saw palmetto flatwoods. They are low-growing shrubs with annual or biennial stems that reach only 4 to 8 inches (10 to 20 centimeters) tall. New stems resprout from the stout taproots after such disturbances as mowing or fires; in fact, the pawpaws are adapted to a natural ground fire cycle in which surface vegetation is burned back every several years.

The beautiful pawpaw has pleasantly scented flowers with creamy white petals that are straight when the flower opens, later becoming recurved. Now extirpated at its type locality and over most of its former range, due at least in part to urbanization in the Fort Myers area, the beautiful pawpaw survives in only two known populations. One is on Pine Island in Lee County, and the other is along a highway near Pirate Harbor in southern Charlotte County. Both populations are on privately owned lands.

Rugel's pawpaw has flowers with straight, oblong, canary-yellow petals. Like the other species, it has declined in numbers and range, and currently it is restricted to an area of southern Volusia County. In 1981, botanists found only 7 populations, which contained a total of fewer than 500 plants. About half of the plants were in a pine flatwoods used for cattle pasture, and most of the rest were in a powerline right-of-way and a recently burned flatwoods. Real estate development is considered a severe threat to this species. All of its populations are on private land near the growing town of New Smyrna Beach, and all but one are within a mile of Interstate Highway 95.

The four-petal pawpaw is larger than the other two species, reaching 3 to 9



Both the beautiful pawpaw (*Deeringothamnus pulchellus*), illustrated above, and Rugel's pawpaw (*D. rugelii*) produce cylindrical berries that have pulpy flesh and are yellow-green when ripe. In his 1926 description of the species, botanist J.K. Small gave the beautiful pawpaw the whimsical common name of "squirrel banana."

feet (1 to 3 meters) in height, with one to several upright stems. Most of its original habitat has been urbanized, but several hundred plants survive on remnants of sand pine scrub in Martin and northern Palm Beach Counties.

Essentially, the species is confined to Jonathan Dickinson State Park, Hobe Sound National Wildlife Refuge (NWR), and several privately-owned tracts. Although the State Park provides protection, small areas are being used for military navigation facilities, which could be altered in the future and affect the four-petaled pawpaw's habitat. Further, the species may occur at sites on or near the refuge where the U.S. Army Corps of Engineers (COE) holds easements for disposal of dredge spoils from the Intracoastal Waterway.

Asimina tetramera and both *Deeringothamnus* species respond well to hurricanes and fires, which control the growth of dense overstory. Without such periodic disturbances, the surrounding trees and other vegetation can eventually shade out the pawpaws. Occasional destruction of their stems may even rejuvenate the pawpaws by stimulating the production of new flowering shoots. With urbanization, however, has come increased fire suppression, which allows competing vegetation to grow and constitutes a threat to all three pawpaw species. Both Jonathan Dickinson State Park and Hobe Sound NWR are

implementing prescribed burning as a management tool; however, this effort will benefit only part of the *A. tetramera* habitat and none of the *Deeringothamnus* sites. Infrequent mowing or cutting could help to maintain the open areas needed by these species, although frequent low mowing could be harmful.

Comments on the proposal to list the three Florida pawpaws are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Endangered Species Field Station, 2747 Art Museum Drive, Jacksonville, Florida 32207 by December 31, 1985.

Serianthes nelsonii

S. nelsonii, a rare tree, is endemic to two of the Mariana Islands in the western Pacific, where it is known in the native Chamorro language as *hayun lagu*. Only two mature trees survive on the U.S. Territory of Guam, and 64 remain on the island of Rota (which is part of the Commonwealth of the Northern Marianas). The species was proposed for listing as Endangered on October 25, 1985.

S. nelsonii reaches 60 feet (18m) or more in height and can have a trunk diameter of nearly 6 feet (1.8 m). Its leaves are about 10 inches (25 cm) long, composed of 20-30 small leaflets in a doubly pinnate pattern. Younger parts of the tree, along with the inflorescence

(continued on next page)

Four Plants

(continued from previous page)

and fruit pods, are covered with rusty-brown "hairs."

Botanists do not know if the tree was ever very common, but extensive areas of native habitat on Guam and Rota have been destroyed by human activities. Some of the early specimens apparently were collected from areas since cleared for the development of Andersen Air Force Base on Guam, and recent clearing of land on Rota for use in agriculture has destroyed limestone forest adjacent to that island's existing *S. nelsonii* population.

In addition to habitat destruction, *S. nelsonii* is threatened by a variety of introduced herbivores. For example, seedlings that have been transplanted from the wild into forest nursery plots have been very susceptible to mealy bug and scale damage, and both of these insects could be affecting trees in the wild. It is known that one of the two trees on Guam is infested by termites. Larger animals are thought to be a problem also. No seedlings taller than 8 inches (20 cm) have been seen recently, and it is believed that they are being eaten by non-native deer and wild pigs.

Because the total *S. nelsonii* population has been reduced to such a low point, it has become more vulnerable to

protected by the territorial government's own endangered species legislation. In December 1981, the Governor of Guam petitioned the FWS to place *S. nelsonii* on the Federal Endangered Species List, an action that would reinforce the existing protection.

The listing proposal did not identify Critical Habitat; however, the U.S. Air Force is aware of the two trees present on Andersen Air Force Base and of the Section 7 habitat conservation responsibilities it will incur if the listing proposal becomes final. There are no known activities on the base that are likely to jeopardize the species.

Comments on the proposal to list *S. nelsonii* as Endangered are welcome, and should be sent to the Regional Director, Region 1 (address on page 2 of the BULLETIN), by December 24, 1985.

* * *

If the proposed listing rules become final, all four species will receive the maximum protection authorized for plants under the Endangered Species Act. Interstate or international trade in listed species is prohibited without an FWS permit. (Seeds from cultivated specimens of Threatened plants are exempt from this prohibition if accompanied by a statement of "cultivated" origin.) Further, it is illegal to remove and reduce to possession listed plants

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of listed species. The only potential Federal action known at this time that could adversely affect any of the four proposed plants would be COE disposal of dredge spoil near some of the *A. tetramera* sites. If this species is listed, the COE would be obligated to consult with the FWS in order to avoid jeopardy to the species. It should be pointed out that the Section 7 habitat conservation measures would apply to all four species even though the dangers of vandalism and overcollection made it imprudent to designate Critical Habitat.

Call for Information on Mussel Die-offs

Several freshwater mussel die-offs have occurred in various rivers throughout the U.S. during 1985. Actually, die-offs have been occurring in the upper Mississippi River since 1982, but the situation has now reached epidemic proportions nationwide. Commercial shell divers estimate that 50 to 75 percent of the mussels in commercial beds are dead or dying. Opinions have been expressed by State agencies and commercial interests that these die-offs may be occurring more frequently than in past decades, and this is an issue that needs cooperative effort for investigation and resolution.

The Virginia Tech Coop Unit is seeking all information, experiences, and opinions on die-off events over the past decade. If there is enough interest, a workshop on mussel die-offs could be convened in 1986 to exchange information and to invite specialists (shellfish pathologists, toxicologists) who can provide information on procedures for investigating these episodic events. If anyone has information that relates to mussel die-offs, knows of individuals who do, or is interested in attending such a workshop, please write: Richard Neves, Cooperative Fish and Wildlife Research Unit, Virginia Polytechnic and State University, Blacksburg, Virginia 24061

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.



four-petal pawpaw (*Asimina tetramera*)

natural hazards, such as storms and wildfires, that would not normally jeopardize the species' overall survival. (Fires resulting from human activities are a threat as well.) Typhoons are common in the region, and at least two of the few remaining trees have already been damaged by high winds.

S. nelsonii already is considered by Guam as endangered and is thereby

from areas under Federal jurisdiction, except under the circumstances described in recently published regulations (September 30, 1985, *Federal Register*, pp. 39690, 39691). Of the four recently proposed plants, this provision would affect only *Asimina tetramera*, and only those few that occur on Hobe Sound NWR. All of the other plants are on State or private lands.

Final Protection Given to Four Plants

The following four plants, located in two southern States, were recently given the protection of the Endangered Species Act:

***Hoffmannseggia tenella* (slender rush-pea)**

Hoffmannseggia tenella, a perennial member of the pea family, grows to about 3 to 6 inches (8 to 15 centimeters) tall and has tiny orange flowers that usually appear from early March until June. Historically, this plant was known from two Texas counties, Nueces and Kleberg, but now only two populations are known to exist, both of them in Nueces County.

In 1982, a field survey located one of the populations near Petronila Creek and State Highway 70. Only three individual plants were observed. On November 21, 1984, the FWS proposed to list *H. tenella* as Endangered in an attempt to rescue the apparently diminishing species (see BULLETIN Vol. IX No. 12). Since publication of the proposed rule, approximately 25 additional plants were located at the Petronila Creek site, and about 10,000 others were found at a second locality—a rural cemetery in southern Nueces County. These newly discovered individuals give the species a better chance for survival.

Both populations of the slender rush-pea occur in the Blackland Prairie area of the Gulf Coast Prairie, where the plants grow with native and introduced grasses. King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*) and Bermuda grass (*Cynodon dactylon*), introduced into the area for roadside management and range improvement, have escaped into uncultivated areas and severely limited the grassland habitat that is suitable for *H. tenella*. In addition, agricultural development and grazing have destroyed the natural characteristics of the Texas Gulf Coast Prairie, which formerly provided more widespread habitat for the slender rush-pea. Any further modification of the plant's remaining habitat may completely eliminate this extremely vulnerable species. However, with the protection given to *H. tenella* authorized by the November 1, 1985, final listing rule, the species may yet escape extinction.

***Cereus eriophorous* var. *fragrans* (fragrant prickly-apple)**

The fragrant prickly-apple is a columnar species of the cactus family with

succulent, cane-like stems that measure from 3 to 16 feet (1 to 5 m) tall. Its nocturnal flowers are scented, white or pink in color, and 3 to 4 inches (7.5 to 10 cm) in diameter; its orange-red fruits measure 2 inches (5 to 6 cm) long. Endemic to the east coast of Florida, this cactus occurs in coastal hammock vegetation, which has largely disappeared as a result of increasing urban development in the State.

Based on recent field work by Florida botanists, the only population of the fragrant prickly-apple known to exist today is located within a limited area of St. Lucie County. It has been extirpated from its other historically known site near Malabar in Brevard County. A second population may exist north of Vero Beach in Indian River County, but its existence has not been verified. At the time the species was proposed for listing as Endangered (see BULLETIN Vol. X No. 4), only 14 individual plants were known to exist, but the subsequent discovery of an additional site increased the number to approximately 200. All of the plants are growing on private land, although they are in proximity to lands owned by the Florida Department of Natural Resources.

While access to the *Cereus eriophorous* var. *fragrans* sites is somewhat restricted, an August 1984 survey showed tracks from off-road vehicles within 50 feet of the cactus at one locality. Because of the low number of plants and their clumped distribution, this cactus is very susceptible to any inadvertent destruction or modification of its habitat. Also, because of its rarity and attractiveness, it could become subject to collection. The prickly-apple produces abundant seeds, and seedlings are now being raised at a botanical garden in Florida. With the protection of the Endangered Species Act recently authorized for the species (F.R. 11/1/85), its chances for survival may increase.

***Dicerandra frutescens* (scrub mint) and *Dicerandra cornutissima* (longspurred mint)**

These two members of the mint family, restricted to very small areas in central Florida, were proposed for listing as Endangered on March 29, 1985, because of threats to their survival from rapidly expanding commercial and residential development (see BULLETIN Vol. X No. 4). Now, with the final listing rule in effect (F.R. 11/1/85), both *Dicerandra frutescens* and *Dicerandra cornutissima*

will be protected from further destruction of their habitats.

D. frutescens is a strongly aromatic plant that grows up to 1.6 feet (0.5 m) tall with erect non-woody shoots growing from a woody base. Its tubular flowers are borne in pairs and are white or pale pink with purplish-rose dots. *D. cornutissima* is very similar in appearance to *D. frutescens* and exudes the same pleasant, minty smell. Although *D. cornutissima* was confused with *D. frutescens* for many years, the two are readily distinguishable. *D. cornutissima* has narrower leaves, its flowers are borne in groups rather than pairs, and the flowers are purple-rose with deep purple markings.

The scrub mint apparently has always been rare and confined to a small region in the sand pine scrub community of Highlands County. Today, it is known from only two areas in the county, one near Lake June in Winter and the other at the Archbold Biological Station, a privately funded research facility. The species has been extirpated from three other sites where it once existed. The population of *D. frutescens* in the Lake June in Winter area is surrounded by developments along U.S. Highway 27, and its habitat is prime property for any continued development. The populations that occur on Archbold Station are largely undisturbed by people, except for vehicular traffic on the fire lanes. A fire management plan in effect for a major portion of the station's approximate 4,300 acres (1,740 hectares) should maintain sufficient open-type scrub habitat to ensure long-term survival of the species there.

The longspurred mint was formerly known from both Sumter and Marion Counties, but now this species is known from only a single area about 11 miles south-southwest of Ocala in Marion County. Much of this area is being developed, and there is a possibility that the fewer than 4,000 plants there could be eliminated if the development continues.

Both *D. cornutissima* and *D. frutescens* are highly visible and occur in areas close to highways, where they are easily collected or destroyed by road maintenance. Woodlander, Inc., a nursery in Aiken, South Carolina, has successfully propagated both species and has sold potted specimens in limited quantities. Some of these plants are now in cultivation at a Florida botanical garden. Captive propagation may have a role in restoring these two species to their native habitat.

Eight Mammals

(continued from page 1)

dwarf hutia also is taken by people that visit its sole remaining habitat, the Zapata Swamp, about 100 kilometers (62 miles) southeast of Havana, Cuba. This species once occurred over a much larger part of the island. Draining and agricultural development is a threat to its remaining habitat.

- Cabrera's hutia (*C. angelcabrerai*)—Discovered only in 1974, the Cabrera's hutia has not been seen again since 1975. If any remain, they apparently are confined in low numbers to mangrove swamps on a few small islands in the Cayos de Ana Maria group off south-central Cuba. In appearance, this animal is similar to the dwarf hutia, and it also has been taken by people for food.
- Leadbeater's possum (*Gymnobelideus leadbeateri*)—This marsupial is found in the coastal forests of southeastern Australia. It apparently requires habitat containing



Buffy tufted-ear marmosets are small primates characterized by unique white ear tufts and black head markings.

mature mountain ash trees over 150 years old that contain hollows suitable for nesting. Many such trees were killed by fire in the 1930's, and most of the possum's remaining range is within areas scheduled for logging.

- buffy tufted-ear marmoset (*Callithrix jacchus aurita*)—Found in very low numbers in an extremely small area in southeastern Brazil, this primate depends entirely on forest habitat, nearly all of which already has been cleared for agriculture, logging, and industrial purposes.
- southern bearded saki (*Chiropotes satanas satanas*)—This primate occurs south of the Amazon River in east-central Brazil. It depends on tropical rain forests, and seems partial to undisturbed habitat. Due to the region's rapidly growing human population, the saki's range is disappearing. Exploitation is another threat to this species; primates in general historically have been heavily exploited for commercial and scientific purposes. Further, the tail of the southern bearded saki is used by some people as a duster, and was being commonly sold in the city of Belem, Brazil, in the late 1970's.

* * *

The listing proposal was based upon data gathered by the International Union for Conservation of Nature and Natural Resources (IUCN), whose Conservation Monitoring Centre in the United Kingdom draws upon authorities from around the world. All eight mammals are already classified as endan-



Chiropotes satanas satanas, a rare Brazilian subspecies of the bearded saki (above), is threatened by destruction of its tropical rain forest habitat and commercial exploitation.

gered in *The IUCN Mammal Red Data Book*.

If the listing proposal becomes final, these mammals will receive the protection authorized for foreign animals under the U.S. Endangered Species Act. It is illegal for any person under U.S. jurisdiction to take, import or export, or engage in international or interstate trade in Endangered species without an FWS permit. Further, it is illegal to pos-

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Leadbeater's possum (*Gymnobelideus leadbeateri*)

Photo by R. Mittermeier, courtesy of World Wildlife Fund-U.S.

Photo by R. Mittermeier, courtesy of World Wildlife Fund-U.S.

Photo by G. Lewis, courtesy of World Wildlife Fund-U.S.

Eight Mammals

(continued from previous page)

ness, sell or transport any such wildlife that has been taken in violation of the Act.

Section 8(a) of the Act authorizes limited financial assistance for programs that the Secretary of the Interior determines to be necessary or useful for the conservation of Endangered species in foreign countries. Sections 8(b) and 8(c) authorize the Secretary to encourage conservation programs for foreign endangered species, and to provide assistance for such programs in the forms of personnel and training.

The buffy tufted-ear marmoset and the Baluchistan bear are on Appendix I of the Convention on International Trade in Endangered Species of Wild

Fauna and Flora (CITES), meaning that people wanting to import these species into the U.S. first must obtain an import permit from the U.S. CITES Management Authority (the FWS Federal Wildlife Permit Office) and an export permit from the country of origin. The southern bearded saki is on CITES Appendix II, which means that imports must have an export permit from the country of origin. All eight mammals will be evaluated by the FWS to determine whether or not they would benefit from additional protection under CITES or other international conservation treaties.

Comments on the proposal to list these eight foreign mammals as Endangered are welcome, and should be sent to the Director (OES), Broyhill 500, U.S. Fish and Wildlife Service, Washington, D.C. 20240, by December 24, 1985.

Diseases Strike Site of Only Known Black-footed Ferret Population

Region 6 Endangered Species Office

The black-footed ferret (*Mustela nigripes*) once ranged over much of the western United States, but currently is known to survive in only one small population near Meeteetse, Wyoming. The ferret's primary food is the prairie dog. In June 1985, dead prairie dogs from the Meeteetse prairie dog population were collected and analyzed by the Plague Branch of the Centers for Disease Control (CDC), in Fort Collins, Colorado. They were found positive for sylvatic plague.

Insecticide application to control fleas began July 6, 1985, and continued through September 13. At the recommendation of CDC, the mouth of each prairie dog burrow was dusted with Sevin, a common insecticidal powder. As prairie dogs moved through their burrows, Sevin dust would cling to their feet and fur, killing fleas both on the animals and in nests deeper within the burrows.

Insecticide dusting crews included personnel from the Plague Branch, CDC; Wyoming Game and Fish Department; U.S. Fish and Wildlife Service (FWS); BIOTA Research, Inc.; Bureau of Land Management; U.S. Forest Service; National Park Service; University of Wyoming; University of Northern Colorado; Nebraska Game and Parks Commission; Utah Division of Wildlife; and the Colorado Division of Wildlife. Crew members were recruited by Dave Belitsky, Wyoming Game and Fish Department, and Max Schroeder, FWS. Daily field work was coordinated and led by Susan Ball, also with the FWS.

A total of 6,200 acres were treated. The remaining untreated areas are principally in inactive colonies. Results of the treatment for plague cannot be fully evaluated until summer 1986. We currently believe, however, that the impact of the disease has been significantly reduced. Prairie dogs remain abundant in most of their original colonies.

Because there is currently only one known population of black-footed ferrets in the world, a great deal of concern has been voiced that a natural disaster, plague, or other diseases could drive the species into extinction. Fears intensified when spotlight surveys conducted during last August's field season indicated the presence of only 58 ferrets. This was fewer than were observed in

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Tinian Monarch Flycatcher Apparently Thriving

The Tinian monarch flycatcher (*Monarcha takatsukasae*), a small songbird endemic to the island of Tinian in the western Pacific Ocean, apparently is thriving and is not in need of Endangered Species Act protection. Accordingly, the FWS has proposed removing this bird, now classified as Endangered, from the U.S. List of Endangered and Threatened Wildlife (F.R. 11/1/85).

Much of the native forest habitat on Tinian was destroyed due to clearing of land for sugar cane production and, later, military action during World War II. Since 1945, however, the island has been revegetated by an introduced woody shrub, *Leucaena leucocephala*, planted by the U.S. military. The Tinian monarch seems to have adapted well to the scrubby, second growth habitat. Forest bird surveys conducted by the FWS in 1982 found the monarch to be the second most abundant bird on the island, with an estimated population of 40,000.

Although agricultural development, military training exercises, and an expanding human population will probably result in the future loss of some forest habitat, most of Tinian is expected to remain in a forested condition favorable to the monarch. There are no known serious avian diseases or predators on Tinian; however, there is some concern that the increase in use of the island by the military could lead to the accidental introduction of a predator like the brown tree snake (*Boiga irregularis*), which is blamed for decimating Guam's native bird life. Both the Department of Defense and the FWS are working to control this snake on Guam and prevent its spread to other islands in the region.

If the proposal to delist the Tinian monarch flycatcher becomes final, this

bird will no longer receive direct Endangered Species Act protection. There are, however, four other species of birds on Tinian that are listed as Endangered: the Mariana mallard (*Anas austaleti*), Mariana gallinule (*Gallinula chloropus guami*), Vanikoro swiftlet (*Aerodramus vanikorensis*), and La Perouse's megapode (*Megapodius laperouse*). Therefore, any major Federal action on the island probably would still require consultation with the FWS under Section 7 of the Act. Further, the Tinian monarch is still, and will remain, under the protection of the Commonwealth of the Northern Marianas Fish and Game Law.

Comments on the proposed delisting are welcome, and should be sent to the Regional Director, Region 1 (address on page 2), by December 16, 1985.



Tinian monarch flycatcher

Photo by H.D. Pratt

Blackfooted Ferret

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either 1983 or 1984. During the fall capture-recapture studies, estimates of the population showed a further drop to 29 animals by September 13, not counting two that had been taken into captivity. Although sylvatic plague was considered a possible cause for the decline, no supporting evidence or literature could be found.

On October 22, 1985, a meeting was held at the Wyoming Game and Fish

Department to discuss the ferrets' decline and plan a course of action. At this meeting, Wyoming Game and Fish Department personnel announced that one of six ferrets then in captivity at a research center in Sybille, Wyoming, had died of canine distemper and that a second ferret was sick. (This second sick ferret later died.) Both animals showed signs of the disease 1 to 3 days after capture. The incubation period for the virus ranges from about 7 to 14 days, which means that they contracted the disease in the wild.

Attendees agreed that, to preserve the species, additional ferrets must be brought into captivity. As of November 18, four ferrets (one healthy and three sick with canine distemper) were isolated at the original research facility and six were in individual isolation at another location in Wyoming. Efforts to survey for additional ferrets are currently planned through November.

The Wyoming Game and Fish Department and the FWS are committed to a long-term captive propagation effort as the best alternative for creation of a new ferret population in the wild.

Endangered Wildflowers Calendar

The 1986 *Endangered Wildflowers Calendar*, now available for purchase from the American Horticulture Society (AHS), features color photographs and information on some of our nation's vulnerable plants. It is designed to increase awareness of the problems facing these rare taxa and to promote their survival. Proceeds from the calendar sales will support AHS plant conservation efforts, including the Wildflower Rediscovery Awards Project, which rewards individuals and organizations that provide confidential information on any plant previously thought to be extinct.

To order, send \$6.95 (postage and handling included) to AHS, P.O. Box 0105, Mount Vernon, Virginia 22121. (AHS members can purchase the calendar for \$6.25.) For a listing of plants thought to be extinct, send a self-addressed, stamped (39¢) envelope.

Revised Notice

(continued from page 1)

cies that are already listed or proposed for listing. Federal land-managing agencies and others with the authority to conserve species prior to their listing under the Act now have a more up-to-date guidance document. Earlier consideration of these taxa in the planning process should lead to fewer potential land-use conflicts, since there is likely to be greater flexibility when accommodating the needs of such plants at an early stage.

The FWS requests any additional data on the plants contained in the revised notice, as soon as possible and on a continuing basis. Comments should be addressed to the appropriate Regional Directors (addresses on page 2 of the BULLETIN) or the Director (OES), 500 Broyhill Building, U.S. Fish and Wildlife Service, Washington, D.C. 20240. Copies of the plant notice are available from the Washington office.

America's Desert Fishes: Increasing Their Protection Under the Endangered Species Act

by
Jack E. Williams¹
and
Donald W. Sada²

"This little fish occurs in the shallow pools along the (Owens) river. It abounds in the bog pastures and tule swamps, and enters the irrigation ditches in large numbers..."

-John Otterbein Snyder on the distribution of the Owens pupfish in 1917. By 1960, this pupfish had been reduced to about 200 individuals in a single, marshy pool in Fish Slough, Owens Valley, California.

* * *

For people in the desert, water always has been a precious commodity. For fishes and other aquatic species in the desert, however, water is life itself.

Fishes may seem few and far between in the desert. Nevada, for example, has only 45 fish species native to its waters. On the other hand, a smaller, midwestern State (Missouri, for example) may have nearly 200 native species of fishes. The distribution of many midwestern fishes extends over two or more States, but many fishes from desert regions are restricted to small, isolated valleys, and a surprising number are endemic to a single spring.

Those desert fishes that do exist are marvelously adapted to their unique environments. The humpback chub (*Gila cypha*), for example, has a pronounced dorsal hump and deeply-forked caudal fin, features that make this fish ideally suited for life in the turbulent flows of the Colorado River. Other spe-

cialized species, such as pupfish, can survive and reproduce in small springs where the salinity is many times that of seawater.

Desert fishes often are highly restricted in distribution. As the western United States has been developed, the already limited habitats of many desert fishes have been drained, diverted, dammed, channelized, or even pumped dry. This loss of habitat is reflected in the number of desert fishes that are listed by the Fish and Wildlife Service (FWS) as Threatened or Endangered. Of the 54 listed fishes in the United States, 40 (or 74 percent) are from the desert areas of the West. These areas include the Sonoran, Chihuahuan, Mohave, and Great Basin Deserts, and the Colorado Plateau.

The status of native fishes is an excellent indicator of the health of aquatic habitats in the desert. These habitats support not only fishes, but a wealth of rare invertebrates and other organisms as well. When Devil's Hole was protected from overdraft of subsurface waters, an action that prevented extinction of the Devils Hole pupfish (*Cyprinodon diabolis*), an endemic snail and riffle beetle on the site also were saved. Highly restricted (and often undescribed) species of invertebrates are commonly found in springs and sloughs inhabited by rare desert fishes. Malacologists estimate that at least nine species of snails,

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Sacramento, California 95825

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4600 Kietzke Lane, Building C
Reno, Nevada 89502

Desert Fishes

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including an undescribed genus, are endemic to springs in Ash Meadows, Nevada. (See the Ash Meadows feature in BULLETIN Vol. VII No. 6.) Although not currently listed as Endangered or Threatened, these snails receive protection through the listing of the Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*), Ash Meadows Amargosa pupfish (*C. n. mionectes*), and Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*) that inhabit the same springs.

Increasing Legal Protection

The past 3 years have witnessed considerable progress in listing proposals for desert fishes. Twenty-two fishes have been proposed during this time for official Endangered or Threatened status, and final action has been taken on 15 species. In addition, final listing rules are expected to be published for ten rare desert fishes within the next year. These fishes are shown on Table 1 and on the accompanying map. By comparison, Table 2 includes a total of 22 desert fishes listed prior to 1983. Much of the recent listing action was precipitated by an April 4, 1983, petition by the Desert Fishes Council to add 17 desert fishes to the U.S. List of Endangered and Threatened Wildlife.

Why are Desert Fishes Vanishing?

Despite the increased listing activity, desert fishes and their habitats are disappearing faster than we can protect them. The reasons for these losses vary.

With the majority of land within most western States in public ownership, proper management of aquatic habitats might seem a relatively simple matter. However, since most lands with a permanent water supply were recognized by early settlers as valuable, most water sources are in private ownership. Even when land is publicly owned, management often has been focused on priorities other than the maintenance of a viable ecosystem. Many streams occupied by the Lahontan cutthroat trout (*Salmo clarki henshawi*), for example, have suffered from overgrazing by cattle. In arid or semi-arid environments, cattle are attracted to water sources and the surrounding riparian vegetation. If overgrazed, these riparian habitats are denuded and become subject to soil compaction and erosion. In recognition of this problem, most Critical Habitat areas for desert fishes include the adjacent riparian habitat. Habitats of other rare desert fishes, particularly the Warner sucker (*Catostomus warneri*),



Devils Hole pupfish

Photo by Tom Baugh

desert dace *Eremichthys acros*), Fosskett speckled dace (*Rhinichthys osculus* ssp.), Fish Creek Springs tui chub (*Gila bicolor euchila*), and Railroad Valley springfish (*Crenichthys nevadae*) also have been damaged by overgrazing.

Water diversions for agricultural or municipal purposes also threaten many desert fishes. Many spring habitats in Ash Meadows, Nevada, for example, have been diverted, drained, and channelized for the benefit of short-term farming programs that eventually failed because of the area's highly alkaline soils.

The warm climate and relatively stable temperatures of many desert springs provide an opportune environment for non-native, tropical fishes. When introduced into desert springs and creeks, these exotics often flourish and soon greatly outnumber the native species. Guppies (*Poecilia reticulata*) have literally taken over Big Warm Springs from the Railroad Valley springfish. Convict cichlids (*Chichlasoma nigrofasciatum*) now are abundant in several Pahranaagat Valley (Nevada) springs, including those of the White River springfish (*Crenichthys baileyi baileyi*) and Hiko White River springfish (*C. b. grandis*). Mosquitofish (*Gambusia affinis*) also have been widely and indiscriminantly introduced into many western U.S. waters, purportedly for mosquito control. Ironically, mosquitofish have often replaced native pupfishes, which are equal to or better for control of the aquatic mosquito larvae.

Too Little, Too Late

Concern for desert fishes has grown in response to the large number of

extinct species and the increasing number of species recognized as being imperiled. By the time that the Endangered Species Act was passed in 1973, more than 10 fish taxa historically known from the Southwest had become extinct, and 19 others were listed by the FWS as Threatened or Endangered. Conservation laws may be slowing the rate of extinction, but the number of listed fish species is rapidly increasing and has made the number of proposed and listed fish species greater for the Southwest than for any other part of the U.S.

Table 3 summarizes the recently extinct fish species within the Southwest. These species generally succumbed to factors that continue to threaten many aquatic organisms in desert regions. Habitat alteration resulting from the development of water resources is to blame for most of the extinctions. This type of development includes depletion of groundwater, which causes springs and creeks to dry. Groundwater depletion, for example, eliminated populations of the Raycraft Ranch and Pahrump Ranch poolfishes (*Empetrichthys latos concavus* and *E. l. pahrump*). Diversion of spring outflows into earthen or concrete canals eliminated the Pahranaagat spinedace (*Lepidomeda altivelis*), and the Shoshone, Tecopa, and Monkey Spring pupfishes (*Cyprinodon nevadensis shoshone*, *C. n. calidae*, and *C. sp.*). The construction of dams impounded large sections of rivers and adjacent areas, eliminating habitats occupied by the Amistad gambusia (*Gambusia amistadensis*) and Rio Grande bluntnose shiner (*Notropis simus simus*).

The establishment of predatory and/or competing exotic species is the

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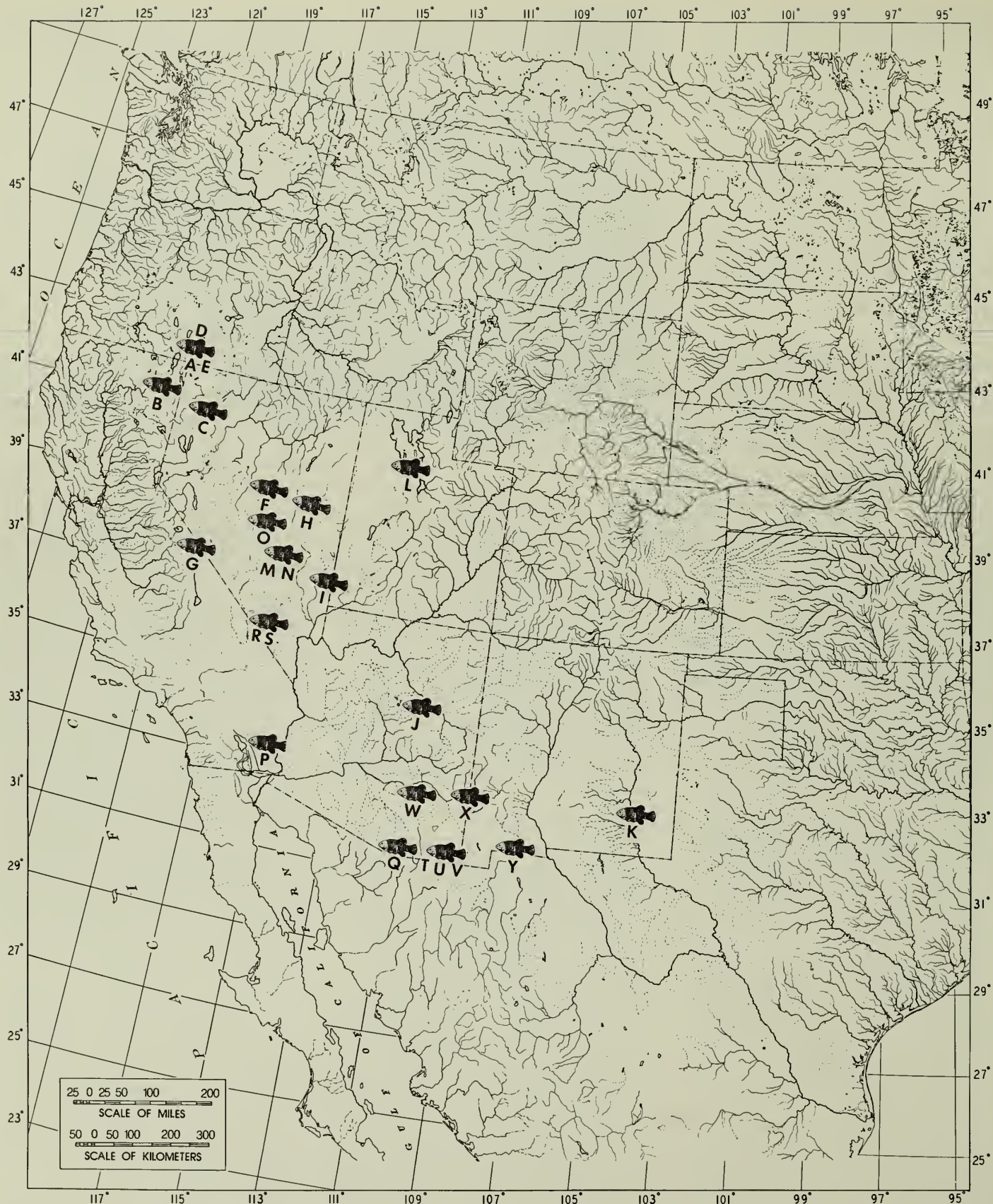


Table 1. Summary of rules to add desert fishes to the List of Endangered and Threatened Wildlife during the past two years. Dates refer to publication of proposed and final rules in the *Federal Register*.

Map Symbol	Species	Classification	Proposed	Final
A	*Warner sucker <i>Catostomus warnerensis</i>	T	5/21/84	9/27/85
B	*Modoc sucker <i>Catostomus microps</i>	E	1/31/84	6/11/85
C	*Desert dace <i>Eremichthys acros</i>	T	5/29/84	pending
D	*Hutton Spring tui chub <i>Gila bicolor</i> ssp.	T	4/17/84	3/28/85
E	*Foskett speckled dace <i>Rhinichthys osculus</i> ssp.	T	4/17/84	3/28/85
F	*Fish Creek Springs tui chub <i>Gila bicolor euchila</i>	T	6/06/84	pending
G	*Owens tui chub <i>Gila bicolor snyderi</i>	E	3/28/84	8/05/85
H	*White River spinedace <i>Lepidomeda albivallis</i>	E	5/29/84	9/12/85
I	*Big Spring spinedace <i>Lepidomeda mollispinis pratensis</i>	T	11/30/83	3/28/85
J	*Little Colorado spinedace <i>Lepidomeda vittata</i>	T	5/22/85	pending
K	*Pecos bluntnose shiner <i>Notropis simus pecosensis</i>	T	5/11/85	pending
L	*June sucker <i>Chasmistes liorus mictus</i>	E	7/02/84	pending
M	*White River springfish <i>Crenichthys b. bayleyi</i>	E	5/07/84	9/27/85
N	*Hiko White River springfish <i>Crenichthys b. grandis</i>	E	5/07/84	9/27/85
O	*Railroad Valley springfish <i>Crenichthys nevadae</i>	T	4/17/84	pending
P	*Desert pupfish <i>Cyprinodon macularius</i>	E	5/16/84	pending
Q	Sonora chub <i>Gila ditaenia</i>	T	7/06/84	pending
R	Ash Meadows speckled dace <i>Rhinichthys osculus nevadensis</i>	E	1/05/83	9/02/83
S	Ash Meadows Amargosa pupfish <i>Cyprinodon nevadensis mionectes</i>	E	1/05/83	9/02/83
T	*Yaqui chub <i>Gila purpurea</i>	E	6/15/83	8/31/84
U	Yaqui catfish <i>Ictalurus pricei</i>	T	7/15/83	8/31/84
V	Yaqui beautiful shiner <i>Notropis formosus</i>	T	7/15/83	8/31/84
W	Loach minnow <i>Tiaroga cobitis</i>	T	6/18/85	pending
X	Spikedace <i>Meda fulgida</i>	T	6/18/85	pending
Y	Chihuahua chub <i>Gila nigrescens</i>	T	12/15/80	10/11/83

*Taxa petitioned for listing by the Desert Fishes Council.

second largest factor in the extinction of native desert fishes. The Ash Meadows poolfish (*Empetrichthys merriami*) disappeared following establishment of aquarium fishes, crayfish, and bullfrogs in its thermal spring habitats. The Independence Valley tui chub (*Gila bicolor isolata*) could not withstand predation from introduced largemouth bass

(*Micropterus salmoides*), and the Grass Valley speckled dace (*Rhinichthys osculus reliquus*) could not survive introductions of rainbow trout (*Salmo gairdneri*) and brook trout (*Salvelinus fontinalis*) into its sole spring habitat. Other species, however, were more fortunate, and were rescued from extinction. The Pahrump poolfish

(*Empetrichthys l. latos*) was rescued from its sole locality in Manse Spring (Pahrump Valley, Nevada) shortly before nearby groundwater pumping caused the spring to fail. It survives in three refugia within Nevada, but is extinct in its native habitat.

Conservation Needs

The extremely localized distribution and small populations of many desert fishes often make the establishment of refugia an important aspect of conservation programs. Refugia populations are not intended to replace native populations within their natural habitats, but to serve as necessary backup genetic resources that provide a source for reestablishing extirpated populations. Unknown aspects of a species' life history, along with land use changes near the refugia, often make it difficult to maintain these artificial populations.

Difficulties in constructing and rehabilitating quality habitat were encountered during efforts to establish a refugium population of the Devils Hole pupfish, and during efforts to reestablish the Moapa dace (*Moapa coriacea*) within portions of its native habitat on the Moapa National Wildlife Refuge in Nevada. Initial translocations of both species were unsuccessful. Success was achieved only after field investigations revealed how these environments must be constructed in order to provide the habitat requirements peculiar to each species.

The degree of a species' vulnerability frequently is of primary influence in the design of specific conservation programs. For example, the southwestern U.S. fish fauna includes a number of species that occupy single springs. These taxa are highly susceptible to extirpation from single episodes of vandalism or unexpected habitat alteration. Providing maximum protection in these instances usually can be accomplished only by purchase of the habitat through fee acquisition or by conservation easements. In the past, such acquisition has been conducted by both private organizations and the Federal Government. In some cases, the acquired habitat can accommodate multiple use if compatible with the conservation of listed species.

Reversing the Slide Toward Extinction

Substantial progress has been made toward preventing further extinctions of desert fishes. The first step toward conservation comes in recognizing the precarious status of a declining species. This occurs when the FWS learns of the problem and determines that a species should be included on the U.S. List of Endangered and Threatened Wildlife.

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Table 2. Desert fishes included in the List of Endangered and Threatened Wildlife prior to 1983.

Species	Historical Range	Status	When Listed
Apache trout <i>Salmo apache</i>	AZ	T	1967
Gila trout <i>Salmo gilae</i>	NM	E	1967
Lahontan cutthroat trout <i>Salmo clarki henshawi</i>	CA, NV	T	1970
Paiute cutthroat trout <i>Salmo clarki seleniris</i>	CA	T	1967
Borax Lake chub <i>Gila boraxobius</i>	OR	E	1982
Mohave tui chub <i>Gila bicolor mohavensis</i>	CA	E	1970
Humpback chub <i>Gila cypha</i>	AZ, CO, UT, WY	E	1967
Bonytail chub <i>Gila elegans</i>	AZ, CA, CO, NV UT, WY	E	1980
Pahranagat roundtail chub <i>Gila robusta jordani</i>	NV	E	1970
Moapa dace <i>Moapa coriacea</i>	NV	E	1967
Woundfin <i>Plagopterus argentissimus</i>	AZ, NV, UT	E	1970
Colorado squawfish <i>Ptychocheilus lucius</i>	AZ, CA, CO, NM NV, UT, WY	E	1967
Cui-ui <i>Chasmistes cujus</i>	NV	E	1967
Pahrump poolfish <i>Empetrichthys latos</i>	NV	E	1967
Devils Hole pupfish <i>Cyprinodon diabolis</i>	NV	E	1967
Comanche Springs pupfish <i>Cyprinodon elegans</i>	TX	E	1967
Warm Springs pupfish <i>Cyprinodon nevadensis pectoralis</i>	NV	E	1970
Owens pupfish <i>Cyprinodon radiosus</i>	CA	E	1967
Amistad gambusia <i>Gambusia amistadensis</i>	TX	E	1980
Big Bend gambusia <i>Gambusia gaigei</i>	TX	E	1967
Pecos gambusia <i>Gambusia nobilis</i>	NM, TX	E	1970
Gila topminnow <i>Poeciliopsis occidentalis</i>	AZ, NM	E	1967

Listing of a species initiates considerable effort directed toward preventing extinction and enhancing a species' status. Among the conservation measures that go with a listing are prohibitions on take (with some exceptions), possession, and interstate or international trafficking in listed species without an FWS permit. Listing also obligates Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize listed species or adversely modify their Critical Habitats. Another important benefit is the requirement for the FWS to develop and implement recovery plans for all listed species in the U.S. These recovery plans are intended to enhance the status of a vulnerable species so that it is no longer Threatened or Endangered and, therefore, may safely be removed from the list.

The Dexter National Fish Hatchery in New Mexico is one FWS facility aimed at preventing the extinction of desert fishes. It is operated as a large refugium and production facility for some of the rarest species. Individuals of the 15 taxa currently being maintained at Dexter not only provide security against extinction, they are a "pool" of stock for reestablishing populations where conservation efforts have successfully ensured long-term protection of native habitat.

Private and public acquisition of habitat for rare fishes has increased during the past 10 years. The Nature Conservancy (TNC) has led purchases of habitats that include Ash Meadows, Nevada (for the Ash Meadows Amargosa, Warm Springs, and Devils Hole pupfishes, and the Ash Meadows speckled dace); Condor Canyon, Nevada (for the Big Spring spinedace, *Lepidomeda mollispinis pratensis*); and Borax Lake, Oregon (for the Borax Lake chub, *Gila boraxobius*). TNC also has been involved in discussions regarding protection of many other habitats. In many instances, TNC acts as an intermediary landowner that purchases unique habitats for eventual resale to appropriate public agencies at original purchase cost. In others, TNC manages the land itself or cooperatively with another entity.

The FWS manages three national wildlife refuges (NWRs) for the protection of endangered desert fishes and their ecosystems. Moapa and Ash Meadows NWRs are in southern Nevada, and San Bernardino NWR is in southeastern Arizona. Purchase of Ash Meadows and the San Bernardino Ranch was assisted by TNC. Moapa and Ash Meadows are thermal spring areas that also support a variety of other rare plants and animals. San Bernardino NWR is a Sonoran desert cienega (wetland) purchased to conserve the Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*) and Yaqui chub (*Gila purpurea*) that still occupy the area. The Yaqui sucker

(text continues on page 14)



Pahrump poolfish

Ash Meadows Amargosa pupfish



Photo by Tom Baugh



Outflow of Big Warm Spring, Railroad Valley, Nevada, before and after the Railroad Valley springfish (*Crenichthys nevadae*) population was virtually eliminated by conversion of the spring for channel catfish propagation. The facility was installed during January 1982.



Photo by J.E. Williams

Desert Fishes

(continued from previous page)

(*Catostomus berrardini*), Yaqui catfish (*Ictalurus pricei*), and Yaqui beautiful shiner (*Notropis formosus*) are other species native to the San Bernardino ecosystem that will be reintroduced in the future.

* * *

On September 17, 1984, the FWS approved the recovery plan for the Owens pupfish mentioned at the begin-

ning of this article. Although far from recovery, thousands of these pupfish now exist in three separate populations. With responsible land management and a greater public awareness of vanishing desert resources, threats to fragile habitats can be minimized and further extinctions prevented. However, the continuing potential for groundwater depletion, river impoundment, and predation and/or competition from continued introductions of exotic species indicate that long-term security for many species still is far from certain.

office, located a new colony of MacFarlane's four o'clock (*Mirabilis macfarlanei*) along the Salmon River near Whitebird, Idaho. With the confirmation of this new colony, there will be a total of nine known extant colonies (six in Idaho and three in Oregon).

* * *

Region 2—Ninety-eight Endangered Gila trout (*Salmo gillae*) were successfully moved from Spruce Creek to Big Dry Creek in the Gila Wilderness in New Mexico. The transfer marked the completion of a 2-year effort to reestablish the Gila trout in Big Dry Creek, and it brings the species one step closer to recovery.

In June 1984, a 1.9 kilometer (1.2 mile) reach at the headquarters of Big Dry Creek was treated with a fish toxicant to rid the stream of exotic trout species. Approximately 3,716 exotic rainbow trout (*Salmo gairdneri irideus*) and brown trout (*Salmo trutta fario*) were killed. However, this treatment was not totally successful, and a second treatment was conducted in June 1985. Natural waterfalls will prevent exotic trout species from reinventing the treated segment of stream.

* * *

The whooping crane (*Grus americana*) that struck a powerline in Idaho during September died in early October as a result of the injuries (see Regional Briefs section of last month's BULLETIN).

The first whooper of the season arrived at Aransas NWR in early October, 2 days earlier than any previous record. By the end of October, at least three whoopers were at Aransas and sightings were being reported in many of the Great Plains States.

The Federal-State Cooperative Plan to protect whooping cranes is operational in 13 States within 3 FWS regions. The plan's main emphasis is to protect or recover whoopers during migration whenever they might be sick or injured, or subject to some hazard such as disease, chemical contamination, or shooting.

The year's first hunt for snow geese (*Chen hyperborea*) at Bosque del Apache NWR in New Mexico was held at the end of October. A single whooping crane present elsewhere on the refuge was not disturbed by the hunting. An objective of the hunts is to encourage continued southward migration of the snow geese wintering flock, which has increased rapidly in recent years. A diminished flock would mean less food competition for the cranes and a reduced hazard of diseases, like the avian cholera outbreak of 1984-85, that are associated with dense bird populations.

* * *

(continued on next page)

Table 3. Recently extinct fishes in U.S. deserts.

Species	State
Alvord cutthroat trout	NV, OR
<i>Salmo clarki</i> ssp.	
Pahranagat spinedace	NV
<i>Lepidomeda altivelis</i>	
Las Vegas dace	NV
<i>Rhinichthys deaconi</i>	
Grass Valley speckled dace	NV
<i>Rhinichthys osculus reliquus</i>	
Independence Valley tui chub	NV
<i>Gila bicolor isolata</i>	
Phantom shiner	NM, TX, Mex
<i>Notropis orca</i>	
Rio Grande bluntnose shiner	NM, TX, Mex
<i>Notropis simus simus</i>	
June sucker	UT
<i>Chasmistes liorus liorus</i>	
Ash Meadows poolfish	NV
<i>Empetrichthys merriami</i>	
Raycraft Ranch poolfish	NV
<i>Empetrichthys latos concavus</i>	
Pahrump Ranch poolfish	NV
<i>Empetrichthys latos pahrump</i>	
Tecopa pupfish	CA
<i>Cyprinodon nevadensis calidae</i>	
Shoshone pupfish	CA
<i>Cyprinodon nevadensis shoshone</i>	
Monkey Spring pupfish	AZ
<i>Cyprinodon</i> sp.	
Amistad gambusia	TX
<i>Gambusia amistadensis</i>	
Utah Lake sculpin	UT
<i>Cottus echinatus</i>	

Regional Briefs

(continued from page 2)

* * *

The Sacramento Endangered Species Office (SESO) staff coordinated with personnel from the San Francisco National Wildlife Refuge (NWR), FWS law enforcement division in San Francisco, Environmental Protection Agency (EPA), and U.S. Army Corps of Engineers (COE), and agents of a developer, to stop illegal diking and blading (filling) activities in diked historical baylands that support a substantial population of the Endangered salt marsh harvest mouse (*Reithrodontomys ravi-*

ventris). Despite having sponsored a salt marsh harvest mouse trapping study for a proposed golf course/condominium project, which resulted in the discovery of an extraordinarily large population (41 mice), the developer disturbed this habitat with caterpillar tractors pulling disks. The COE responded quickly, issuing a cease and desist order the same day. After subsequent discussion with the COE, EPA, and FWS, the developer has agreed to cease any "weed abatement" on the property.

* * *

Craig Johnson, a Bureau of Land Management (BLM) biologist who works closely with the FWS' Boise field

Regional Briefs

(continued from previous page)

A recent survey conducted by the FWS, Texas Parks and Wildlife Department, and the University of Texas indicates that the Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*) currently occupies 46,000 acres, which represents an 81-percent reduction in habitat since 1967. If this trend continues, it is estimated that the population could decline to 800 birds on 37,000 acres by the year 2000. Currently, the prairie chicken is being successfully managed on the Attwater Prairie Chicken NWR; however, this population is susceptible to being extirpated by a natural disaster or disease. Protection of additional habitat is being considered.

Region 4—Continued bald eagle (*Haliaeetus leucocephalus*) activity in the North Carolina area during the summer and early fall of 1985 was highlighted by the development of a summer roost. The roost, located near Durham, North Carolina, on the recently completed Jordan Reservoir, has had up to 42 bald eagles, the majority of which were immature and juvenile birds. A great deal of public interest was generated by this roost, so the Wildlife Resources Commission designated a public viewing point along one of the adjacent State highways. The origin of these birds is thought to be Florida.

In 1980, the first recorded green sea turtle (*Chelonia mydas*) to come ashore to nest on a North Carolina beach was tagged after carrying out her nesting duties. The event occurred on Onslow Beach, part of the Marine Corps Base at Camp Lejeune, North Carolina. This summer, the same female green sea turtle, now weighing about 500 pounds, returned to Onslow Beach and nested again. In 1980, this particular turtle nested four times and laid a total of 819 eggs. This year, it again nested four times and laid a total of 728 eggs.

The Jacksonville Endangered Species Field Office recently became involved in a plan to protect active bald eagle nests during a mosquito control operation for *Culex nigripalpus*, a carrier of St. Louis encephalitis (SLE), in a coastal Florida county. The county was recently placed on a SLE alert by the State.

Due to the heavy rainfall experienced recently in south Florida, there is a great deal of standing water, even under the eagle nests. Several years ago, buffer zones were established to protect these territories from low-level helicopter spraying. The FWS realized that when these buffers were established, control of the *Culex* mosquito would be necessary from time to time, and the 750-foot

buffer zone would have to be inundated. At the present time, a reduced horizontal and vertical buffer has been agreed upon to protect the nests and ensure that public health is maintained.

The Jacksonville Endangered Species Field Station has received a draft final report on a status survey for the rosemary wolf spider (*Lycosa ericeticola*), a Category 2 invertebrate listing candidate. The spider was previously known only from the type locality near Interlachen in Putnam County, Florida, where it occurred in an area with extensive rosemary (*Ceratiola ericoides*) stands. The status survey, conducted in 1984-1985 by the FWS' Florida Cooperative Fish and Wildlife Research Unit, located the species at twelve additional sites in Putnam County in turkey oak/longleaf pine/rosemary habitat.

Although rosemary is widely distributed throughout Florida, the spider has not been located at rosemary sites outside Putnam County. Longleaf pine communities are threatened throughout the Southeast, so the limited distribution of the rosemary wolf spider makes it vulnerable to eventual habitat loss as suburban development continues in Putnam County. Fortunately, the species occurs in part on the University of Florida - Florida State Museum's Ordway Preserve, and thus some of its habitat is protected.

Region 5—The Region 5 Endangered Species Office staff attended The Nature Conservancy's (TNC) eastern regional conference at Shelter Island, New York, on October 28-30. One purpose of the meeting was to assess the results of this year's cooperative field studies. Personnel from eastern regional offices of TNC and individual State heritage programs have been working with the FWS to systematically determine the rangewide status of 32 plant listing candidates and other invertebrate species that may qualify for Federal protection. As a result of this season's field work, the status of many species has been clarified, and excellent information is now available to support listing proposals for several plant species. This FWS/TNC project is scheduled to continue for at least another year.

Region 5 personnel hosted an instructional workshop on October 25 for State agencies having approved cooperative plant agreements with the FWS under Section 6 of the Endangered Species Act. State representatives were briefed on administrative procedures, the Federal aid application process, funding priorities, and other aspects of the cooperative agreement program. Seven of the 13 States in the region now have cooperative plant agreements, and 5

more States hope to have their agreements finalized soon.

Region 6—Two members of the Gray's Lake, Idaho, whooping crane flock spent considerable time this fall roosting and feeding near Ft. Collins, Colorado, an area located east of the Rocky Mountain Front Range and east of the cranes' previous migratory path (see last month's Regional Briefs section). Public interest in these birds was impressive. After observation by many of the local citizens, a large number of avid birdwatchers, and some out-of-State visitors, both birds were reported gone from their sites on the morning of October 29.

Region 7—Recoveries of two American peregrine falcon (*Falco peregrinus anatum*) nestlings banded along the Yukon River in Alaska this summer have been reported. One of the birds was found dead in western North Dakota on September 30, and the other bird was live-trapped in good condition at Dry Tortugas near Key West, Florida. Both are the first Alaska birds recovered in these States. With a band recovery rate approaching 5 percent (1,621 birds banded and 78 returns), the banding program in Alaska continues to provide valuable information on survival rates, migration routes, and wintering habits of peregrines.

The Aleutian Island Unit of Alaska Maritime NWR carried out recovery efforts for the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*) again this summer. One hundred and thirty-six geese were captured on Buldir Island, and 124 were transported by vessel and released on Amchitka Island. Bad weather, capture paralysis, and bald eagle predation somewhat hampered the transplant effort. Observations of these geese, marked with yellow leg bands and black numerals, can be reported to Dr. Paul Springer, Humboldt State University, at 707/826-4759.

Region 8 (Research)—The black-capped vireo (*Vireo atricapillus*), a Category 1 listing candidate, has declined in numbers in recent years throughout its historical breeding range from Kansas to Coahuila, Mexico, primarily due to nest parasitism by cowbirds and destruction of its favored brushland habitat from overgrazing by sheep and goats. A spring 1985 census by Denver Wildlife Research Center biologists revealed 275 adult birds in the State of Texas, including about 164 breeding pairs in 30 sites. A pilot experimental removal of cowbirds from three areas increased production from 2 young (by 24 pairs) in 1984 to 24 young (by 33 pairs) in 1985. These results suggest

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Regional Briefs

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that cowbird control in selected areas of adequate vireo habitat may be a viable recovery method. If the population in potentially large breeding areas, such as Big Bend National Park, could be increased to the carrying capacity of its habitat, this species, which disperses readily into available habitat, might recognize parts of its former range.

The Patuxent Wildlife Research Center reports that a California condor (*Gymnogyps californianus*), the female member of the Santa Barbara pair and one of only six individuals remaining in the wild, was captured with a cannon net on October 1 and fitted with two new radio transmitters. The attending veterinarian drew blood from the condor for contaminant analysis and indicated she appeared to be in good health. The bird was alert upon release and was observed the following day with her mate near the capture site.

The Seattle National Fishery Research Center (SNFRC) initiated a 3-year project in Fiscal Year 1984 to obtain life history and ecological information on the Moapa dace (*Moapa coriacea*). Descriptions of some major accomplishments follow:

Data from a baseline inventory of stream ecosystems on the Moapa NWR in Nevada suggest that, in terms of water chemistry, benthic communities, and available drift items, the mainstem and tributary stream (the only place where successful Moapa dace reproduction is known to occur) are comparable. A status survey of the species was conducted in the Warm Springs area, and the dace

population there was estimated at 3,000 individuals—over three times the number of dace than had been thought to exist.

Studies of habitat requirements indicated that adult dace habitat was limited on the Moapa NWR, so a 400-foot section of stream was constructed and added to the refuge. The research team designed the new stream reach and

supervised its construction, saving the FWS about \$46,000 in contractor fees.

Other information is currently being gathered on Moapa dace reproduction biology, emigration behavior, food habits, and growth and mortality rates. The SNFRC is confident that a large, self-sustaining population of Moapa dace can be established on the refuge within a few years.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	19	234	4	0	22	304	23
Birds	60	13	141	3	1	0	218	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	19	3	0	74	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	10
Plants	86	5	1	23	2	2	119	43
TOTAL	258	47	458	71	10	37	881	220**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 185

Number of species currently proposed for listing: 27 animals
29 plants

Number of Species with Critical Habitats determined: 91

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

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Technical Bulletin

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PUBLIC DOCUMENTS
DEPOSITORY ITEM

JAN 24 1986

Three Species Proposed for Endangered Species Act Protection

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A species of turtle, plant, and fish thought vulnerable to extinction were proposed recently by the Fish and Wildlife Service (FWS) for listing as Endangered or Threatened. If the proposals later become final, Endangered Species Act protection will be extended to the following taxa:

Flattened Musk Turtle (*Sternotherus depressus*)

A small aquatic species, the flattened musk turtle is found only in parts of the Black Warrior River system in northern Alabama. This distinctive reptile is declining in numbers and range, primarily because of water quality degradation and collecting. The FWS has proposed listing it as a Threatened species (F.R. 11/1/85).

The flattened musk turtle apparently has rather specific habitat requirements, which include rivers or large creeks with alternating pools and vegetated shallows, an abundance of submerged rocks, and plenty of small mollusks for food. Good water quality is particularly important; there should be low silt loads and deposits, a minimal bacteria count, and little chemical pollution. Unfortunately, population surveys, observations, and U.S. Geological Survey water quality records indicate that only 15 percent of stream habitat within the river basin remains quality habitat for the turtle.

Siltation appears to be a primary factor in the habitat degradation. By 1975, approximately 117 square miles within the flattened musk turtle's range had been disturbed by surface mining of the underlying coal deposits, an activity that produced 50 percent of the region's accelerated erosion and sedimentation. The Alabama Surface Mine Commission notes that the rate of coal production from surface mining increased about 30 percent from 1975 to 1985, and the U.S. Department of Agriculture (USDA) estimates that 419 square miles will be disturbed by 2020. Logging, another significant source of erosion, is



Photo by C. Kenneth Dodd, Jr.

The flattened musk turtle (Sternotherus depressus) is a small aquatic species with a distinctly flattened carapace up to 4.7 inches (119 millimeters) long and dark brown to orange in color.

expected to almost double by the same year. In 1980, annual erosion from commercial forest land in the Black Warrior Basin was already 5,350,000 tons, and the USDA predicts that rate will increase 78 percent by 2020. Soil lost from crop land and pastures in 2020 is projected to be 2,569,000 tons above the amount annually replaced.

Siltation presumably affects the flattened musk turtle by 1) reducing or eliminating populations of mollusks and other invertebrates upon which the turtles feed, 2) physically altering the rocky habitats where turtles seek food and cover, and 3) forming a substrate in which heavy metals and toxic chemicals tend to accumulate. The flattened musk turtle is also vulnerable to chemical and sewage pollution, which can erode its shell, cause infections, and further reduce food organisms. Most of the pollution is from "non-point" sources, such as acid mine drainage, agricultural chemical runoff, and industrial and residential effluents.

Another threat to the flattened musk turtle is commercial exploitation. Most of the formerly good populations have been considerably reduced this way in

recent years. Turtles have appeared on several animal dealer price lists at more than \$80 each. It is hoped that a bill passed by the Alabama legislature in May 1984 to prohibit collecting of flattened musk turtles without a permit may control trade in the species.

Several Federal activities could have an impact on flattened musk turtle habitat and could be affected by a final listing rule. U.S. Forest Service-approved logging programs often include clear cutting, road building, and application of herbicides and/or insecticides. Such practices would likely increase the amounts of silt and chemical pollution in the Black Warrior River system. Mineral leasing by the Bureau of Land Management, certain Federal Highway Administration projects, and activities permitted or carried out by the U.S. Army Corps of Engineers (such as dredge and fill operations) could lead to greater siltation and further degrade the habitat. Projects funded by the USDA through the Agricultural Stabilization and Conservation Service and the Soil Conservation Service could produce both adverse and beneficial effects.

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of November:

Region 1—At a recent recovery team meeting for the light-footed clapper rail (*Rallus longirostris levipes*) and Califor-

nia least tern (*Sterna antillarum browni*), it was reported that the tern population increased in number from 518 fledglings in 1984 to 682 in 1985. Several colonies experienced reduced predation pressure, which accounts for the increase in productivity. Also reported was that a red fox (*Vulpes vulpes*) removal pro-

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gram at Seal Beach National Wildlife Refuge is closer to becoming a reality. Approximately 35-40 red foxes use the refuge and have seriously depleted its wildlife resources, including the light-footed clapper rail.

The Sacramento Endangered Species Office (SESO) staff met with Thomas Reid Associates and a project proponent on a proposed residential development along the base of Milagra Ridge in the city of Pacifica, California. Portions of the proposed development are habitat for the Endangered mission blue butterfly (*Icaricia icarioides missionensis*). Overall project mitigation includes a program to control exotic vegetation, which is the primary threat to the butterfly's larval food plants on the ridge.

The Olympia, Washington, Field Office personnel participated in the removal of elk from the Columbian White-tailed Deer National Wildlife Refuge. Twenty-three elk cows and calves were captured and transported off the refuge. Elk compete with the Endangered Columbian white-tailed deer (*Odocoileus virginianus leucurus*) for forage and escape habitat, and because of the large number of elk on the refuge, damage to deer habitat from trampling and overuse has occurred. This is the second year elk have been removed from the refuge.

At the request of the Fish and Wildlife Service (FWS) Division of Law Enforcement in Bellevue, Washington, and the National Marine Fisheries Service (NMFS) sea turtle coordinator in Hawaii, a dead leatherback sea turtle (*Dermochelys coriacea*) that had washed ashore near Ocean Shores, Washington, was examined. No determination of the cause of death could be made. NMFS law enforcement is currently investigating this incident, which is the fourth time a dead leatherback has been known to wash up on Oregon and Washington beaches this fall.

Region 2—By November 19, 94 whooping cranes (*Grus americana*) had arrived at Aransas National Wildlife Refuge (NWR) in Texas, including all 16 young banded in Canada in August. This is the largest number of young to arrive at Aransas since surveys began in 1938.

The two whoopers that spent September and October east of the Rockies in Colorado migrated into New Mexico early in November.

(continued on page 13)

The Snail Kite, an Endangered Floridian

by Robin H. Fields
Jacksonville Endangered Species Field
Station

—second of two parts—

The question facing agencies and organizations interested in the snail kite (*Rostrhamus sociabilis plumbeus*) is "What can be done to protect this bird, its habitat, and its food source before the situation is too late?"

State Action

Under its own Endangered and Threatened Species Act of 1977, Florida provides for research and management of State-listed endangered species to conserve and protect them as a natural resource. Regulations issued by the Florida Game and Fresh Water Fish Commission implement this protection through prohibitions on taking, possession, transport, or sale of the kite except under permit from the Commission; however, the regulations do not provide protection for habitat.

Florida's Water Management Districts (WMDs) were created in 1972 and are under the authority of the Florida Department of Environmental Regulation (DER). The DER is primarily responsible for monitoring water quality. The main functions of the WMDs are to promote the conservation, development, and use of surface and ground water; to develop and regulate dams, impoundments, and reservoirs; to prevent damage from floods, soil erosion, and excessive drainage; to preserve natural resources (including fish and wildlife); and to promote recreational development on public lands. WMDs also issue permits for certain water uses, develop water use plans, issue emergency prohibitions during droughts, and assist the DER with water pollution control.

The Federal Approach

On the Federal level, the snail kite and its Critical Habitat receive the protection authorized by the Endangered Species Act of 1973, as amended, which includes prohibitions on taking, sale, offer for sale, import, and export of these birds without a Fish and Wildlife Service (FWS) permit.

The Act also requires that all Federal agencies ensure that their actions are not likely to jeopardize the survival of the species or adversely modify its Critical Habitat. One such agency that has consulted with the FWS on ways to avoid adverse impact on the snail kite is the U.S. Army Corps of Engineers (COE). This agency is responsible for administering Section 404 of the Clean Water Act of 1977, which deals with the protec-

tion of wetlands by regulating the discharge of dredge or fill materials into U.S. waters.

Refuges and Preserves

The FWS manages the 145,635-acre Loxahatchee National Wildlife Refuge, which was established in 1951 through a cooperative agreement with the then Central and Southern Florida Flood Control District. Among the primary objectives of the Loxahatchee NWR is the management and protection of the snail kite. The refuge also acts as a clearinghouse for the Snail Kite Sighting Program, through which the public reports snail kite sightings to refuge staffers.



male snail kite at Loxahatchee National Wildlife Refuge

These data are evaluated by the refuge as a means of monitoring kite populations and movements. Such information is particularly valuable for a better understanding of kite dispersal patterns during droughts.

Other snail kite habitat is protected within Everglades National Park, located in the extreme southern tip of peninsular Florida. The heart of the Everglades, designated as a national park in 1947, is actually a river 6 inches (15 centimeters) deep, 50 miles (80 kilometers) wide, and flowing seaward on a riverbed that slopes just a few inches per mile.

In addition to governmental action, the National Audubon Society, an independent conservation organization, also works to save the snail kite. As part of its habitat conservation program, Audubon leases two areas totalling about 28,000 acres on the west side of Lake Okeechobee. This Audubon wildlife sanctuary is one of the kite's principal nesting areas.

Recovery Efforts

In 1983, the FWS released the Everglade Kite Recovery Plan. (See story in BULLETIN Vol. VIII No. 8) This plan is a management tool developed to identify and implement the various steps needed to halt the decline of the snail kite and to recover the subspecies to a secure status. It addresses the roles of each of the involved agencies and organizations. A dynamic document, it is being updated as more data become available.

Obviously, the objectives of the numerous agencies that have a role in south Florida water management are not all compatible with optimum snail kite habitat management. Needs for water for agriculture, flood prevention, drinking, wildlife habitat, and recreation must all be integrated into a system that can meet these often conflicting demands. Innovative approaches on the part of the land, water and wildlife management agencies and organizations will be required to ensure the survival and recovery of the snail kite.

An example of a cooperative effort is about to begin. The South Florida Water Management District has designed an experimental water release program. Its purpose is to provide Everglades National Park, to the south, with water on a planned schedule in an attempt to restore more natural water conditions in the park.

As part of a Section 7 consultation with the COE on the experimental water release program, the FWS has recommended that a monitoring program be initiated to determine the impacts of the water release on Endangered species in the area, including the snail kite. It is hoped that valuable data will be gathered on such topics as snail kite use in the area, including feeding, nesting, and nest site location.

Interagency Consultations

South Florida is recovering from a 1984-85 drought during which kites dispersed from their historic areas and

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Photo by Luther C. Goldman

The Gating of Hubbard's Cave—A Volunteer Effort

By Robert R. Currie
Asheville (North Carolina) Endangered
Species Field Station

Progress toward the recovery of the Endangered gray bat (*Myotis grisescens*) received a significant boost last summer. A section of Hubbard's Cave, once a winter home of over 250,000 gray bats, was gated to exclude unauthorized trespassers. The cave is also a winter home for at least seven other bat species, including the Endangered Indiana bat (*M. sodalis*).

Human disturbance of the hibernating bats had reduced the gray bat population in Hubbard's Cave to about 150,000 individuals. The only feasible means of eliminating human disturbance of this gray bat hibernaculum was to build a gate which excluded humans but permitted free access for the bats. Over 5 years of hard work by The Nature Conservancy (TNC), Dr. Merlin Tuttle of Bat Conservation International (BCI), and the Fish and Wildlife Service's Asheville Endangered Species Field Station was required to initiate the project. TNC purchased the 50-acre Hubbard's Cave preserve, located in east-central Tennessee, in 1982, but delays in obtaining clear title to the property prevented TNC from closing on the purchase until 1984.

The smallest place to build a gate in the entrance to the bat section of the cave was 35 feet wide by 35 feet high. To construct a full bat gate over such a large opening would require over 100 tons of steel and 5 tons of concrete, at an estimated cost of over \$100,000.

The Cave Conservation Institute (CCI), a volunteer organization in southwestern Virginia, was contacted for assistance. CCI, which has helped to protect over a dozen caves in the southeast, visited the cave and designed a gate to fit the entrance. CCI estimated
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Photo by Joy Franklin

The base of the Hubbard's Cave gate is more than 60 feet below the main cave entrance. A CCI volunteer is shown cutting steel with an oxy-acetylene torch. At this point, the gate was 20 feet high and two weekends from completion.

The Snail Kite

(continued from page 3)

sought refuge in the few habitats that still retained water, such as the city of West Palm Beach's Water Catchment Area. During the drought, a biologist from Loxahatchee NWR documented about 370 kites feeding in the water catchment area and roosting in a site selected by Palm Beach County for development of a resource recovery facility. These kites represented over 50 percent of the total known kite population that existed before the drought. Across from the recovery facility site, another area has been selected for a planned industrial park. Both of these

projects would affect the kite, although neither is located within the designated Critical Habitat. Since Section 404 permits from the COE would be required, both projects will be subject to future Section 7 consultations.

Drought-related habitats are becoming increasingly rare in this rapidly growing State. When these habitats are gone, the snail kite will no longer have wet areas in which to seek refuge during general drought conditions. The result could be a drastic population decline. In the meantime, the Jacksonville Endangered Species Field Office is working with Palm Beach County to investigate alternatives to lessen the impact that the planned resource recovery facility could have on this important kite area.

Another COE consultation involves the use of a registered herbicide, Velpar, at Lake Okeechobee within an area that is designated as Critical Habitat for the snail kite. COE proposes to apply the herbicide as a means of controlling the Australian punk tree (*Melaleuca quinquenervia*), an exotic species that is rapidly altering native habitats. The FWS is concerned that there are no data on the toxicity of Velpar to invertebrates, particularly the kite's primary prey, the apple snail (*Pomacea paludosa*). Section 7 consultations between the FWS and the COE are proceeding, and both agencies are working together to develop appropriate precautions and to investigate the possibility of collecting toxicity information.

Hubbard's Cave

(continued from page 1)

that the gate could be constructed, using volunteer labor, for about \$15,000. Obstacles to be overcome included improving the road to the cave so that the steel, concrete, and heavy equipment needed for the project could get to the site, lining up volunteers to actually do the work, renting or buying equipment, and raising the money needed to do the work.

General Carl Wallace, the Adjutant General of the Tennessee Army National Guard, offered to improve the road and transport all construction materials to the site. This was accomplished during two weekends as a National Guard training exercise. A burglar alarm system with a direct line to the local sheriff was also installed by the National Guard to protect the equipment.

The Richmond Area Speleological Society, a non-profit group interested in the exploration and protection of caves, donated \$11,000 to TNC for the project. Mid-State Steel of Tennessee provided the steel for the gate at cost. Several member organizations of the National Speleological Society, including the Nashville Grotto, the Flittermouse Grotto of North Carolina, and the Birmingham Grotto, committed themselves to volunteer labor. Most of CCI's active



Photo by Merlin D. Tuttle courtesy of Bat Conservation International

gray bat (*Myotis grisescens*)

members worked on the project from beginning to end, and several of TNC's members also helped.

The actual work on the gate began in July. Volunteers spent six 2½-to 3-day weekends pouring concrete, and cutting, carrying, and welding the steel. Four to five welding machines were kept running almost continuously. TNC reimbursed volunteers for their travel expenses, provided food, and arranged for sleeping and cooking facilities at a nearby summer camp. The Asheville Endangered Species Field Station, TNC, and the volunteers feel the protection of Hubbard's Cave was well worth the massive effort.

The gated section of Hubbard's Cave will be open for exploration from mid-May through mid-August, when the bats are not present, and the section most popular with cavers will remain open year-round. For information on visiting Hubbard's Cave, contact the Tennessee Nature Conservancy, P.O. Box 3017, Nashville, Tennessee 37219.

Poorly designed gates can be very harmful to bats. For information on the proper use of gates to protect bats, contact Robert Currie at the Asheville Field Office (100 Otis Street, Room 224, Asheville, North Carolina 28801).

Proposed Species

(continued from page 1)

Comments on the proposal to list the flattened musk turtle as a Threatened species are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213, by December 31, 1985.

Large-flowered Skullcap (*Scutellaria montana*)

A rare member of the mint family, *S. montana* is known from only 10 locations in the mountains of southeastern Tennessee and adjacent areas in Georgia. Fewer than 7,000 individuals exist, and over 90 percent of them are concentrated at two sites. Threats to the species and its habitat include logging, urbanization, and a quarrying operation. Due to its vulnerability to extinction, the FWS has proposed listing the large-flowered skullcap as Endangered (FR 11/13/85).

S. montana is a herbaceous plant with stems growing 12 to 22 inches (30 to 55 centimeters) high and opposite leaves 2 to 3 inches (5 to 8 centimeters) long. Its attractive blue and white flowers appear in May and early June, and the fruit, a

light brown nutlet, matures in late June to early July. The species occurs on moist rocky slopes under a canopy of mature hardwoods (primarily oaks and hickories). All known sites show little or no evidence of disturbance from logging or livestock grazing. Core samples taken from surrounding trees show ages ranging from 70 to over 200 years old, depending on the site.

Currently, of the ten known populations of *S. montana*, seven are in Georgia and three are in Tennessee. The largest Georgia population, occurring in Floyd County, contains approximately 1,300 plants, and most of the site is owned and protected by The Nature Conservancy. All six of the other Georgia populations of *S. montana* are much smaller, and are located on privately owned land. The species' largest known population, consisting of about 5,000 plants, is in Marion County, Tennessee. Approximately half of these plants are on land owned and managed by the Division of Forestry, Tennessee Department of Conservation; the others are on private property that has been subdivided for residential development and is currently being offered for sale. Both of Tennessee's other *S. montana* populations are on unprotected land and contain only a few plants.

The overwhelming concentration of most *S. montana* individuals at two sites increases the species' vulnerability to extinction. Historically, it probably was more widespread, but the mature hardwood stands that *S. montana* requires have become quite limited. The factors that led to the species' decline threaten the few remaining plants with extinction. Because the plants are attractive and vulnerable to collecting, the FWS decided not to pinpoint the populations with a proposed designation of Critical Habitat; however, habitat conservation measures of the Endangered Species Act will apply if the species is listed.

Comments on the proposal to list *S. montana* as an Endangered species are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801, by January 13, 1986.

Waccamaw Silverside (*Menidia extensa*)

This fish derives its common name, the Waccamaw silverside, from the silvery stripe along each side and from

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APPROVED RECOVERY PLANS

This issue of the BULLETIN summarizes some of the recovery plans for listed species that have been approved during 1985. Copies of the plans can be purchased approximately 6 months after their approval from the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421 (toll free).

Brady Pincushion Cactus (*Pediocactus bradyi*)

The Brady pincushion cactus is a rare species known only from a few sites within Coconino County in northern Arizona. Since its discovery in 1958, this cactus has declined markedly due to collecting and habitat alteration. It was listed in 1979 as Endangered, and the *Brady Pincushion Cactus Recovery Plan* was approved on March 28, 1985.

P. bradyi grows on gravelly limestone benches and terraces in the Navajoan Desert near the Marble Canyon of the Colorado River. Its potential habitat is estimated to total 17,000 acres (70 square kilometers), but the species has been found on only 10 to 20 percent of the portion that has been searched. Populations are scattered throughout private property, Bureau of Land Management (BLM)-administered land, National Park Service lands, and the Navajo Indian Reservation.

One of the most serious threats to the survival of the Brady pincushion cactus is collecting. This cactus is in high worldwide demand by certain collectors because of its rarity, and its removal from native habitat by individual hobbyists and by commercial suppliers has been noted. As it is one of the most difficult cacti to grow on its own roots in cultivation, there is a continuing demand for replacement stock. Seed collection also can be harmful because *P. bradyi* is fairly short-lived and produces an annual average of only 25 seeds per plant.

Some habitat within the species' historical range has been destroyed, and there is danger of further degradation. An immediate source is off-road vehicle (ORV) use. Four-wheel drive vehicles in particular are causing damage to the populations west of Marble Canyon. Uranium exploration and mining on the Arizona Strip (the part of Arizona north of the Colorado River) represent further potential threats to Brady pincushion cactus habitat. There are a number of claims filed for areas near *P. bradyi* populations, and the BLM has received plans for exploration on apparently suitable habitat adjacent to a known colony.

Livestock grazing in areas likely occupied by the Brady pincushion, including four BLM allotments, could be affecting the species by trampling the plants and

disturbing their habitat. Grazing on all of the allotments occurs primarily during the wet season, between November and May. This is also the period during which *P. bradyi* is emergent and most vulnerable to the effects of trampling; at other times, most of the stem retracts into the soil.

Recovery Actions

The *Brady Pincushion Cactus Recovery Plan* seeks to ensure the species' survival by reducing the drain on wild populations from collectors and by carefully managing the habitat. When 75 percent of its known habitat receives permanent protection, a reclassification from Endangered to Threatened can be considered; the criteria for recovery and a subsequent delisting, however, cannot be established until there is a complete census of the cactus within its known range.

One of the recovery plan's highest priorities is simply a greater enforcement of existing conservation laws. Federal land managing agencies also can fully use their regulatory authorities for conserving the habitat. For example, the recovery plan recommends that the BLM, which regulates mining on public land, review the files of mining claimants and inform them about the presence of any listed species.

Specific management actions can be taken to conserve known Brady pincushion cactus sites. Signs informing people that cacti are protected by Federal and State laws could deter some potential collectors. Relocating a roadside gravel dump that destroyed some former *P. bradyi* habitat would eliminate use of the site as a parking area for collectors and could make it possible to rehabilitate the habitat. The recovery plan also suggests that the National Park Service act to control ORV damage to *P. bradyi* habitat near Lees Ferry by erecting signs and by the "judicious placement of boulders."

A high priority recommendation of the recovery plan is development of a Habitat Management Plan (HMP) for Brady pincushion cactus habitat on BLM-administered lands. An HMP, the primary management tool BLM uses to conserve listed species, has been drafted and addresses the impacts of such activities as grazing, mining, and ORV use. If a complete ORV closure is found to be necessary, a formal designation should be pursued. The impacts of livestock, particularly in the vicinity of feeding and watering sites, also need to be monitored regularly. Already, plans for three proposed "range improvement" projects (fences, water catchments and troughs) have been drawn in a way to avoid *P. bradyi* habitat. The

BLM also has established new procedures to improve its monitoring of three of the cactus populations. FWS biologists will work cooperatively with the BLM on developing management plans.

A better knowledge of *P. bradyi* ecology is necessary for land managers to make the wisest possible decisions regarding the species' habitat. The data will also be important for evaluating any plans to artificially propagate *P. bradyi* for reestablishing populations and/or for developing a legal trade in the species. (The FWS is considering the possibility of encouraging trade in cultivated specimens of listed cacti as a means of reducing the demand for cacti illegally collected from the wild.)



The Brady pincushion cactus (Pediocactus bradyi) is a small, semiglobose plant that bears straw-yellow flowers. During the dry season, most of the stem retracts into the soil.

Drawing by Susan Edwards, courtesy of the Natural Resources Defense Council

Recovery Plans

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Knowlton Cactus (*Pediocactus knowltonii*)

P. knowltonii, the smallest member of its genus, may also be the most vulnerable. The only known viable population is restricted to a single hill of gravelly alluvial deposits south of La Boca, Colorado, in San Juan County, northern New Mexico. A second population, consisting of two individual plants, is located in Reese Canyon (also San Juan County), but it shows no sign of reproduction and may be the last survivors of a 1960 transplant attempt.

In 1960, the *P. knowltonii* population was estimated at more than 100,000 plants. That same year, however, some members of the New Mexico Cactus and Succulent Society set out to "rescue" the Knowlton cactus from flooding due to the construction of the Navajo Dam. They collected all the plants they could from the La Boca population, and some might have been transplanted at Reese Canyon. The removal ultimately turned out to be unnecessary because the floodwaters of Navajo Lake never affected the species' habitat.

P. knowltonii numbers continued to decline until, by 1979, there were probably fewer than 1,000 remaining and the species was listed as Endangered. At that time, many collectors believed the cactus to be extinct in its natural habitat. Since 1980, seeds left in the soil have germinated, and the *P. knowltonii* population has increased to approximately 10,000 plants. But the species is still very vulnerable to collecting. Many hobbyists and cactus dealers know the exact location of the La Boca population, which is concentrated on 12 acres (5 hectares), with the highest densities within only 2.5 acres (less than one ha). Almost all of the remaining plants are young, which suggests that collectors are still selectively removing older specimens. With the number of seed-bearing cacti decreasing, fewer seedlings are becoming available to replace them.

In an effort to protect the La Boca population of *P. knowltonii*, the Public Service Company of New Mexico donated the surface rights to 25 acres (10 ha) of land surrounding the population center to The Nature Conservancy (TNC). Six energy firms hold the mineral rights, however, and the site is in an area of proven oil and gas deposits. TNC hopes to obtain the cooperation of these firms so that any future energy exploration and/or production can be planned to avoid the cacti.

BLM administers the Reese Canyon site, where eight Knowlton cacti

Legal Protection for Listed Cacti

A number of Federal and State laws have been passed to help conserve rare cacti. The Federal Endangered Species Act (ESA) was amended in 1982 to prohibit the removal of listed plants from lands under Federal jurisdiction without a permit. Arizona's Native Plant Law restricts the collection of Brady pincushion cacti without a permit for educational or scientific purposes, and prohibits collecting on private lands without the landowner's permission. A recently passed New Mexico law, which recognizes the Kuenzler hedgehog and Knowlton cacti as being endangered, also prohibits collecting of these species on public lands or on private lands without landowner permission. Collecting on the Navajo Indian Reservation also is prohibited.

Because prohibitions against take are usually difficult to enforce, controls on commercial trade in protected species are necessary. The ESA prohibits interstate and international trafficking in Endangered and Threatened species without a permit. Seeds and cuttings of Endangered plants are included under the ban, but seeds of commercially propagated Threatened plants are exempted. Nursery owners must obtain permits from the Federal Wildlife Permit Office (FWPO) in order to sell propagated stocks of listed species. Another Federal law, the Lacey Act, gives Federal support to State con-

servation regulations. Since 1981, it has prohibited interstate trade or export of native wild plants collected or possessed in violation of the State (or, in the case of Indian lands, the reservation) of origin.

International trade in rare cacti is further controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Both *Pediocactus bradyi* and *P. knowltonii* are on Appendix I of CITES, which means that their export from the U.S. could occur only if 1) the importing country issues an import permit and 2) the Fish and Wildlife Service (FWS) finds that export will not be detrimental to the species and the FWPO issues an export permit. *Echinocereus fendleri* var. *kuenzleri* is on CITES Appendix II, which requires that the FWPO issue a permit before export. CITES regulations for artificially propagated cacti are more flexible; for further information, contact the Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

* * *

Habitat conservation, another critical issue for rare cacti, is addressed in Section 7 of the ESA. Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize listed species. If an agency determines that one of its actions may affect such a species, it must consult with the FWS on ways to avoid jeopardy.

occurred in 1981. Several years ago, a road widening project resulted in the unintentional destruction of six of the plants; the other two continue to survive but show no sign of reproduction.

Recovery Actions

The Knowlton Cactus Recovery Plan, approved on March 29, 1985, calls for restoring the primary (La Boca) population to approximately 100,000 cacti, a level near the estimated carrying capacity of its habitat, and for ensuring long-term protection of the site. More data are needed, however, before specific, quantitative recovery goals can be established.

This recovery plan, like all others for listed cacti, recommends that applicable State and Federal conservation laws be enforced as effectively as possible, particularly those addressing trade. Under Section 7 of the ESA, BLM has the responsibility to conserve habitat at the Reese Canyon site. A fence has been built around the site to protect the species and its habitat. The agency recently concluded a 2-year survey for *P. knowltonii* on lands it manages elsewhere in

the vicinity, and no other populations were discovered.

TNC, which owns the site of the only known viable population, has erected a strong barbed-wire fence to keep out cattle, and it will need periodic maintenance. Without a fence, cattle grazing on adjacent lands could enter the TNC property and trample the plants; the fence also might deter some collectors.

The loss of three-fourths of the Reese Canyon *P. knowltonii* population during a road widening project was a costly reminder that special care should be taken in the maintenance or construction of roads in the area. Any further roads planned for the Los Pinos River Valley or Reese Canyon area should include site surveys for Knowlton cacti. Surveys will also be needed prior to oil or gas development on potential *P. knowltonii* habitat in the area. If the species is found at a potential drill site, slant drilling should be considered.

Because the Knowlton cactus essentially exists at only one known site, the recovery plan highly recommends establishing other populations of the

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Recovery Plans

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species in potential habitat within its historical range. Just such an effort began when cuttings were taken from some of the La Boca plants last spring and kept in a greenhouse until ready to transplant. In early September, 104 Knowlton cacti were introduced at a site in northwestern New Mexico. They will be monitored carefully to make certain if this is a valid recovery technique.

The project was a cooperative venture among the FWS, BLM, Bureau of Reclamation, State of New Mexico, and TNC.

Kuenzler Hedgehog Cactus (*Echinocereus fendleri* var. *kuenzleri*)

An even rarer cactus is the Kuenzler hedgehog, which, until recently, was known in the wild from only two locations. A third locality approximately 40 miles to the north of the others was discovered recently. Collecting is critically endangering the survival of this variety, and there are several potential threats to its habitat. In an effort to prevent its extinction, the Kuenzler hedgehog was listed by the FWS in 1979 as Endangered.

The three population centers are in the Rio Hondo and Rio Penasco drainages of Lincoln, Otero, and Chaves Counties, New Mexico. Most of the occupied habitat for the Kuenzler hedgehog is on private property, although small amounts lie within Lincoln National Forest and lands administered by the BLM and the State of New Mexico. A few scattered plants may occur on the Mescalero Apache Indian Reservation.

Some of the Kuenzler hedgehog sites are visited periodically by cactus hobbyists and commercial dealers. The large magenta flowers are easily seen from as far away as 100 yards. U.S. Forest Service personnel observed two sites from which all of the Kuenzler hedgehog cacti were removed, and once the dormant seeds remaining in the soil germinated and the plants grew to flowering size, they also were taken. Both sites were on private or State lands, and therefore not afforded legal protection from collection or habitat destruction at that time. However, the New Mexico Endangered Plant Law, which took effect November 1, 1985, recognizes the Kuenzler hedgehog cactus as endangered. It prohibits collection of the cactus on public lands or on private lands without a permit. Any that occur on lands under Federal jurisdiction, however, receive protection from take and habitat degradation.

No known significant amount of suitable habitat has been destroyed by human activities; however, road con-



by Vic Stein

A Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*)

struction and maintenance, real estate development, and cattle grazing are potential future threats. Exclosure studies are being conducted to determine the extent of livestock-related impacts on seedling establishment and the survival of adult plants.

Recovery Actions

The preliminary goal of the *Kuenzler Hedgehog Cactus Recovery Plan* (approved March 28, 1985) is to foster and maintain 5,000 individual plants, consisting of one or more wild, self-sustaining populations, for a period of 5 consecutive years. Once this has been accomplished, a reclassification of the cactus from Endangered to Threatened can be considered. Criteria to determine when the cactus is recovered have not yet been delineated.

Active enforcement of all endangered species conservation laws and regulations is particularly critical to the success of this recovery effort. As an Endangered plant, the Kuenzler hedgehog receives full ESA protection. Specific enforcement tasks should be identified and coordinated with the staff of the FWS Division of Law Enforcement.

Another high priority of the recovery plan is for the FWS to work with the Forest Service and BLM in developing management plans for the small portion of Kuenzler hedgehog cactus habitat on federally-administered lands. These plans, which will address potential impacts from ORVs, grazing, and mining, will assist both agencies in fulfilling their habitat conservation responsibilities under Section 7 of the ESA. Similar coordination with New Mexico officials regarding habitat on State lands is advocated.

Because most of the habitat is on private property, recovery will depend on the cooperation of the landowners. Once a good working relationship has

been established, agreements to protect the cactus and its habitat should be pursued.

Continued monitoring of the known populations, surveys to discover any other, evaluation of potential reintroduction sites, and research into improved propagation techniques are among the other subjects discussed in the recovery plan.

New Mexico Ridge-nosed Rattlesnake (*Crotalus willardi obscurus*)

Ridge-nosed rattlesnakes (*Crotalus willardi*) are widely scattered in isolated populations throughout the southwestern United States and northwestern Mexico. These snakes, which are primarily diurnal, live in cool mountaintops at elevations between 6600-7100 feet. Often called "sky islands," these remote patches of pine-oak woodland habitat have supported ridge-nosed rattler populations for many thousands of years, resulting in the divergence of the separate populations into several distinct subspecies.

The New Mexico ridge-nosed rattlesnake (*C. w. obscurus*) was first collected from the Animas Mountains of southwestern New Mexico in 1957. Populations also occur in the adjacent Sierra San Luis of Chihuahua and, possibly, Sonora, Mexico. For several years, the Animas Mountains population was thought to belong to another subspecies, the west Chihuahua ridge-nosed rattlesnake (*C. w. silus*), but eventually the distinctiveness of *C. w. obscurus* was recognized.

The New Mexico ridge-nosed rattlesnake, the last subspecies to be discovered, is probably the most distinctive of the five recognized subspecies of ridge-nosed rattlesnakes. *C. w. obscurus* is grayish brown rather than the rich brown color of the other subspecies, and it lacks the white marks on its head that the other's possess. It is small, reaching less than 2 feet in total length, and feeds on a broad variety of prey, including small mammals, birds, lizards, other snakes, and arthropods. Because of its secretive nature, an accurate estimate of its numbers is not available.

This subspecies presents no real threat to humans in its extremely limited and restricted range. Though poisonous, it rarely strikes out in defense and its bite is relatively mild compared to that of most other rattlers. No fatality has ever been recorded as a result of a bite from a New Mexico ridge-nosed rattlesnake.

The greatest threat to *C. w. obscurus* is overcollection for the pet and zoo trades. Following publication of the first record of the New Mexico ridge-nosed

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Recovery Plans

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rattlesnake in 1957, collectors from all parts of the country went to the Animas Mountains to obtain specimens. The snake's beauty, uniqueness, and rarity enticed many zoos and private collectors to pay very high prices for a single individual. Unscrupulous collectors often used highly destructive capture methods that destroyed habitat, further reducing the snake's range. Even more devastating is the method used by some collectors of pouring gasoline over the snakes' cover to force them out, often killing some in the process.

Collecting continued relatively unabated until April 19, 1974, when an agreement restricting entry to the Animas and protecting the snake's habitat was signed by the Fish and Wildlife Service (FWS) and the property owner. In January 1975, the subspecies' population in New Mexico was given protection by the State as an endangered species. On August 4, 1978, the FWS listed *C. w. obscurus* as Threatened and designated its Critical Habitat as the western part of the Animas Mountains.

Habitat alteration through other means also threatens this ridge-nosed rattler. Fire and excessive cattle grazing could affect the populations in the Animas Mountains because of the limited habitat and restricted distribution of the subspecies. Mining, development, and wood harvesting in its range might also threaten its survival. Mining is of particular concern because mineral rights in the area have been retained by Tenneco, the previous owner of the property,

which has continued to explore for minerals in the area. Other threats to the New Mexico ridge-nosed rattlesnake include predation, starvation, and disease. The present disjunct distribution of the various populations would make recolonization of *C. w. obscurus* after a major die-off virtually impossible.

Recovery Actions

The *New Mexico Ridge-nosed Rattlesnake Recovery Plan*, approved by the FWS on March 22, 1985, outlines steps that should be taken in order to improve the status of this snake to the point where its survival is secure. The plan is tailored specifically for recovery of the New Mexico population, but most of the proposed recovery actions also are applicable to populations in the Sierra San Luis. The objectives of the plan are to confirm the major threats to the survival of all *C. w. obscurus* populations and to propose actions designed to ensure that this snake remains a part of our natural heritage.

Since populations of ridge-nosed rattlesnakes in the Animas Mountains are protected by both the State of New Mexico and the Federal government, current laws must continue to be enforced to ensure that illegal collecting, harassing or killing of the snakes, and destruction of their habitat does not occur. Every effort should also be made to obtain written agreements with private, State, Federal, and international authorities to provide enforceable protection measures to guarantee that essential habitat of *C. w. obscurus* is preserved.

Much still remains to be learned about all ridge-nosed rattlesnakes, especially

the New Mexico subspecies. All that really is known about *C. w. obscurus* is that it is confined to a very small area, geographically isolated from other populations, and apparently very scarce. Consequently, further study is essential to better understand the needs of this obscure animal. The recovery plan calls for the establishment of a program designed to monitor populations of the New Mexico ridge-nosed rattlesnake on a regular basis in order to gather necessary data on distribution, movements, numbers, and population structure. Studies should also be conducted to determine appropriate habitat management practices.

In addition to population and habitat studies, data should be obtained on various aspects of the snake's behavior, including activity and reproductive patterns, prey relationships, and mortality factors. Once all the data are gathered, plans to reduce or eliminate threats to *C. w. obscurus* can be developed and implemented.

There are currently no unoccupied areas where the snake historically occurred that would be suitable for reintroduction to broaden its limited range. Nonetheless, the recovery plan proposes that establishing two or three "zoo" populations, one from Sierra San Luis stock and two from the Animas Mountains, would be advantageous to the rattler's recovery. Not only could more be learned about the basic biology of the species by studying the individuals, but surplus snakes could be released into both the Animas and Sierra San Luis to augment existing populations, should the need arise.

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Photo by Robert Simmons

The New Mexico ridge-nosed rattlesnake (*Crotalus willardi obscurus*) is probably the most distinctive of the five recognized subspecies of ridge-nosed rattlesnakes.

Recovery Plans

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Texas Poppy-mallow

Described by the Garden Club of America as among Texas' most beautiful wildflowers, the Texas poppy-mallow (*Callirhoe scabriuscula*) also is one of the State's rarest. The few small populations apparently are restricted to an unusual habitat type, pockets of deep, sandy soil blown from alluvial deposits, found along the Colorado River in Runnels County, Texas. Over recent years, many of the plants have been lost due to habitat destruction. Sand mining is the most immediate threat, although grazing, other forms of habitat damage, and collecting also are problems. *C. scabriuscula* is increasingly in danger, and could become extinct in the wild within the next decade unless immediate action is taken.

The *Texas Poppy-mallow Recovery Plan*, written by Dr. Bonnie Amos of Baylor University, was approved by the Fish and Wildlife Service (FWS) on March 29, 1985. It outlines management steps to conserve the remaining plants and their habitat, although limits in current data make it impossible to quantify the future conditions that will be needed to declare the species as recovered. Once more information is gathered, the plan will be reevaluated to determine if specific recovery goals can be calculated.

The highest priority of the plan is to secure the existing *C. scabriuscula* populations and their habitats. All currently known individuals occur on private lands; therefore, landowner cooperation is essential for the survival, not to mention recovery, of the species. The FWS hopes that property owners, after being notified of the plant's presence and rare status, will take an active interest in its conservation. Sand mining could be shifted to other areas, while fencing could control the harmful effects of collectors and cattle (which sometimes trample the plants and disturb the soil). Area landowners should be made aware of the potential damage to the species from herbicides and insecticides, which can eliminate both the plant



Photo by Bonnie Amos

The cup-shaped flowers of the Texas poppy-mallow are wine-purple with a dark maroon center, making this Endangered plant one of the state's most attractive wildflowers.

and its pollinators. The plan also calls for

There are other windblown sand deposits in the region similar to those occupied by *C. scabriuscula*, and they should be searched thoroughly to learn whether or not any unknown populations exist. If no other plants are discovered, the alternative of reestablishing the species in unoccupied parts of its historical range will take on greater importance. Additional populations would provide the species with some insurance in the event that the currently known plants suffer catastrophic destruction.

annual monitoring of existing populations to document any further declines in numbers and/or range.

Some plants were seen on a State road right-of-way in 1978, but have not been observed there since that time. It is possible that, with the cooperation of the Texas Highway Department, *C. scabriuscula* could reestablish itself in this area. Road-

side mowing would have a serious impact on the plant, and should be conducted after the flowering and fruiting season. Some populations of the species also occur on or near a railroad right-of-way, where herbicide spraying takes place.

In order to make management plans as effective as possible, it may be necessary to learn more about the ecology and life history of *S. scabriuscula*. Studies on seed viability, germination, seedling establishment, and plant demographic trends could provide information vital to reestablishing the species. An analysis of environmental factors (such as soil and moisture conditions) could aid in habitat management and in selecting potential reestablishment sites. The recovery plan also calls for further investigations into the species' apparent dependence on a few pollinators to determine if it is a limiting factor, particularly in view of pesticide use in the area.

The U.S. Plant Rescue Center Program

by Jeffrey P. Jorgenson
Federal Wildlife Permit Office

An illegal shipment of orchids was seized recently by plant inspectors of the Animal and Plant Health Inspection Service (APHIS, Department of Agriculture). The importer subsequently forfeited the plants and, in accordance with a cooperative program established by the Departments of Agriculture (USDA)

and the Interior, the plants were assigned to a "plant rescue center."

In this case, the orchids were sent to the Wheeler Orchid Collection and Species Bank in Muncie, Indiana. Affiliated with Ball State University, this facility is one of 31 designated Plant Rescue Centers nationwide that have agreed to care for rare plants that have been seized and otherwise would be destroyed. After 30 days, the confiscated orchids became a part of the Wheeler Orchid Collection.

According to Mr. Russell Vernon, the curator, they will be used for scientific research, display, environmental education, and propagation.

Founded in 1972, the Wheeler Orchid Collection and Species Bank long has been involved in the conservation and propagation of orchids. The collection consists of more than 7,000 specimens representing more than 3,000 species from throughout the world. Since 1979,

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Rescue Center

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the U.S. Fish and Wildlife Service (FWS) has assigned more than 1,000 plants from 15 countries to Wheeler. These specimens are readily accessible to interested persons and organizations. In addition, pollen, seeds, and plant divisions are exchanged with other institutions and growers to enhance the availability of rare species and reduce the need for wild collecting. These exchanges also help to secure the future for species that may become extirpated due to habitat loss. According to Vernon, native habitat in an area 7 times the

area of Rhode Island vanishes every 3 months within the tropical regions of the world.

CITES Trade Controls

The orchid shipment mentioned above was seized because it lacked an export permit. All orchids, as well as cacti and many other vulnerable taxa, are listed on Appendix I or II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and their international trade is strictly regulated under a permit system.

In 1983, the countries party to CITES agreed to eliminate the "personal bag-

gage" exemption for living specimens. This means that export permits will have to be obtained for all shipments of live CITES-listed plants and animals, while most plant parts, products, and derivatives will still be eligible for the exemption.

The FWS established the Plant Rescue Center Program in 1978 in response to the need to care for plants legally abandoned (voluntary action by importer) or forfeited (specimens taken from importer after completion of judicial procedures) to the U.S. Government due to noncompliance with CITES import/export requirements. Initially, the Federal Wildlife Permit Office, acting as the U.S. CITES Management Authority, assigned these shipments to the National Botanical Garden in Washington, D. C., and affiliated agencies. Their capacity to care for abandoned or forfeited plants was soon reached, however, and the Permit Office had to enlist additional centers. Today, 31 public institutions and one government research laboratory cooperate as Plant Rescue Centers.

Facility Requirements

There are several basic conditions that a prospective Plant Rescue Center must meet or accept, assuming that it has the facilities and expertise to keep the plants healthy. The center must be a public, nonprofit entity and be, or be associated with, a public botanical garden, zoological park, or research institution. Specimens may only be displayed, propagated, or used for other purposes consistent with CITES. The assigned specimens remain property of the U.S. Government, and the rescue center may not trade, sell, or otherwise dispose of these specimens; propagules of these specimens, however, may be traded commercially. Upon acceptance as a Plant Rescue Center, the institution becomes eligible to receive shipments of abandoned and forfeited plants.

Assignment of Seized Plants

Several factors are taken into account in assigning abandoned or forfeited plants, including the port at which the specimens were seized, the distance to an appropriate Plant Rescue Center, the expertise of nearby centers, and climatic conditions where the plants will be kept. Plants held in Hawaii or Puerto Rico usually are assigned to local Plant Rescue Centers rather than sent to the mainland. The Permit Office does not assign shipments to northern sections of the U.S. during winter in order to avoid freezing the plants during transit. It also considers the expertise and limitations of the center; several have indicated an interest in receiving only

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Stanhopea wardii



The Wheeler facility contains a large Paphiopedilum collection.

Rescue Center

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certain taxa or shipments containing only small quantities of plants.

Assignment Procedure

The general assignment procedure, typically conducted through telephone contacts, is as follows:

A shipment is inspected by USDA Plant Inspectors and, if found not to be in compliance with CITES, usually is detained. At this point, most importers voluntarily abandon the plants, which are then assigned to a rescue center. In rare cases, such as those of returning travelers or business people new to the plant trade, the importer is given the choice of abandoning the specimens, obtaining proper export documentation from the country of export/reexport, or returning the plants to the country of export at personal expense. (Most eventually are abandoned.) Any that have not been returned or abandoned within 20 days automatically are forfeited to the U.S. Government if no proper documentation has been obtained.

Upon abandonment, the USDA contacts the Permit Office, which selects an

appropriate Plant Rescue Center, confirms its interest and ability to receive the shipment, and advises the USDA, which then packages the specimens for air or surface shipment and sends them, at U.S. Government expense, to the center. It takes only about 30 minutes from the time the USDA notifies the Permit Office until the Permit Office notifies the USDA concerning which Plant Rescue Center will receive the plants.

The Permit Office prepares a written notification to the Plant Rescue Center and the USDA confirming the shipment, as well as to the officials in the country of export/reexport asking if they are interested in return of the shipment. After 30 days, if the foreign official does not want the plants back or has not responded, the shipment becomes part of the rescue center collection. However, several countries have requested that plants be returned, and they usually have been shipped back via a national airline at no cost to the foreign government.

Plant Rescue Center Activities in 1984

During 1984, the Permit Office assigned 99 intercepted shipments to 23

Plant Rescue Centers. These shipments contained 1,665 plants, 100 kilograms of *Abies guatemalensis* seed, 50 grams of *Encephalartos* sp. (Zamiaceae) seed, and 2 tree fern trunks. They had originated in 32 countries (not including one shipment of unknown origin). In addition, 13 shipments (containing 22,145 plants, including 21 cacti, 3 cycads, 21 orchids, and 22,000 Zamiaceae) were returned to two countries of export.

* * *

The Plant Rescue Center Program enables the United States to meet its conservation obligations under CITES, while avoiding the problems that might occur if USDA Plant Inspectors had to resolve each abandonment case individually. More importantly, it provides care and protection for highly desirable but vulnerable plant resources. For additional details on the program, contact the Federal Wildlife Permit Office, 1000 N. Glebe Road, Room 611, Arlington, Virginia 22201 (telephone 703/235-2418).

Proposed Species

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its only known range, Lake Waccamaw and its immediate outflow in Columbus County, North Carolina. Sometimes also referred to as the skipjack or glass minnow, the species has a slim and almost transparent body. Adults usually reach only about 2.5 inches (6.5 cm) in length.

Silversides become sexually mature at one year of age and they spawn from April to June. Most die shortly after spawning, although a few may survive a second winter. With such a brief life cycle, the Waccamaw silverside could become extinct if its ecosystem ever deteriorates to the point that reproduction fails for even a single season. The vulnerability of this fish and its habitat prompted the FWS to propose listing it as a Threatened species (F.R. 11/7/85).

Lake Waccamaw, where the species is locally abundant, is unique in a number of ways. Although it is fed by acidic swamp streams, the lake has a virtually neutral pH. Dr. Charles Yarborough of Wingate College (North Carolina), who has been studying Lake Waccamaw, describes it as "an island of neutrality in an acid sea." This condition, rare among North Carolina's coastal plain lakes, probably results from the buffering effects of an exposed limestone formation. The waters support an unusually diverse fish and mollusk fauna. Already

a registered North Carolina Natural Heritage Area, Lake Waccamaw also has been proposed as a National Natural Landmark. The lake is owned by the State and administered by the North Carolina Division of Parks.

The Waccamaw silverside's restricted range increases its vulnerability to habitat degradation. It has not been collected outside the lake, with the exception of the immediate outflow during periods of very high water. Lake Waccamaw is large, occupying approximately 8,934 acres (3,618 hectares), but has an average depth of only 7.5 feet (2.3 meters). Historically, good water quality has been one of the most important factors in the survival of the silverside. Unfortunately, recent studies indicate that the lake may be experiencing

increases in nutrient loading, which could lead to large blooms of algae. If this trend continues, it could unbalance the sensitive, natural lake ecology and put it in danger of eutrophication. Large mats of decomposing algae could consume dissolved oxygen, making it unavailable for the fish. The lake environment is also vulnerable to the potential effects of certain land use practices within the watershed if these activities do not take into account the fragility of the Lake Waccamaw ecosystem.

North Carolina's Division of Parks already regulates commercial use and the construction of piers, docks, drainage ditches, and similar activities on the lake. Current recreational and scientific take of the species is not a threat and

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Waccamaw silverside (*Menidia extensa*)

Photo by B. M. Burr

Proposed Species

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should not be affected by a listing rule. The State Wildlife Resources Commission regulates taking of the Waccamaw silverside through the issuance of collecting licenses. Since scientific and commercial take under current guidelines are not considered threats to the species, the proposed listing rule contains an exemption to the general prohibitions on this activity. Collecting of the Waccamaw silverside would not be subject to Federal regulations if conducted in full accordance with State laws pertaining to the species.

The listing proposal included a designation of Critical Habitat for Lake Waccamaw and a 0.4 mile (0.6 km) section of Big Creek, which feeds the lake. Currently, the FWS is aware of only one proposed Federal project that may affect the Waccamaw silverside and its proposed Critical Habitat—the relocation of U.S. Highway 74. The FWS has been in contact with the Federal Highway Administration and the North Carolina Department of Transportation concerning possible means of avoiding any adverse impacts.

Comments on the proposal to list the Waccamaw silverside as a Threatened species are welcome, and should be

sent to the Field Supervisor, Asheville Endangered Species Field Office, by January 6, 1986.

Available Conservation Measures

If the proposals to list the flattened musk turtle, large-flowered skullcap, and Waccamaw silverside are made final, they will receive the protection authorized under the Endangered Species Act. (The conservation measures applied to Threatened species are the same as those for Endangered species, except that the classification of Threatened allows for special rules to grant greater management flexibility.) Among the benefits of a final listing are the prohibitions on interstate or international trade in listed species without a permit; the obligation for the FWS to develop a species recovery plan; and the possibility of Federal funding for State conservation efforts. Such financial aid is authorized under Section 6 of the Act for States that have approved Endangered Species Cooperative Agreements with the FWS. Currently, Georgia and North Carolina have such agreements covering the species discussed in this report.

The take of listed plants is not prohibited by the Act unless they are on land under Federal jurisdiction, although State conservation laws apply in many

cases. With regard to animals, it is generally illegal to take, possess, or transport listed species within the United States without a Federal permit; however, an exception to the prohibition on take is available in certain circumstances for species listed as Threatened. Such an exception was included in the proposal to list the Waccamaw silverside as Threatened, since the threat to this fish is habitat degradation rather than take. State regulations already govern take of the Waccamaw silverside, and, as long as they are complied with, Federal permits for this activity will not be required.

Habitat conservation is addressed under Section 7 of the Act, which requires Federal agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize a listed species or adversely modify its Critical Habitat. Even though the FWS deemed it unwise to publicize the exact location of the remaining large-flowered skullcap and flattened musk turtle locations with a designation of Critical Habitat, these species will receive Section 7 habitat protection if listed. If a Federal agency finds that one of its activities may affect a listed species, it is required to consult with the FWS. Through consultations early in the planning process, it is usually possible to find ways of achieving project goals without jeopardizing listed species.

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A half-hour television tape was made on the recovery of the gray wolf (*Canis lupus*) and on the Idaho State Historical Museum's wolf exhibit. The program, made in cooperation with the Boise area's Channel 12, aired throughout the Boise Valley.

The managed snow goose hunts that were held at Bosque del Apache NWR during late October and early November failed to achieve one objective, that of encouraging geese to continue their southward migration to reduce the potential disease hazard and competition for refuge foods. Two hundred hunters took about 100 geese. Record numbers (50,000) of snow geese were using the refuge in late November.

Nine delegates of the People's Republic of China visited the regional Endangered Species Office December 1-3 as part of a 16-day tour of the United States. Delegates spent a full day at the Bosque del Apache NWR learning about refuge biology and management and viewing various species, including the whooping crane. Their visit included a

tour of the Rio Grande Zoological Park, in Albuquerque, New Mexico, where the delegates saw Endangered bald eagles (*Haliaeetus leucocephalus*) and Mexican wolves (*Canis lupus*), and heard presentations about captive management of Endangered species. They will visit Aransas and Santa Ana NWR's in Texas before going on to Louisiana, Washington, D.C., and Madison, Wisconsin.

The FWS has established a "Mexican Wolf Captive Management Committee," which met for the first time at the Rio Grande Zoo on November 15. The committee is composed of a representative from each facility holding Mexican wolves, and one representative each from the FWS and the Mexican Wolf Recovery Team. The status of the 29 animals in the Mexican Wolf Captive Breeding Program was reviewed, decisions were made for the 1986 breeding season, and guidelines for the operation of the committee were discussed. It is hoped that this committee can establish a sound captive program for the Mexican wolf.

A status report on the black-capped vireo (*Vireo atricapillus*) was completed

recently. In 1985, 35 adult vireos were found in only three places in Oklahoma (representing about 12 breeding pairs) and 280 adults in 33 places in Texas (representing about 168 breeding pairs). The black-capped vireo is threatened by cowbird parasitism in both Oklahoma and Texas. For example, at the largest known colony at Wild Basin near Austin, Texas, only two young were fledged in 1984. With cowbird control in 1985, 24 young were fledged.

Through purchase and easement agreements, the FWS has acquired five eastern Oklahoma bat caves for the preservation of the Endangered Ozark big-eared bat (*Plecotus townsendii ingens*). These new acquisitions will become part of the Sequoyah NWR. Recent surveys indicate that there are probably fewer than 400 Ozark big-eared bats left in the wild. The species' historic range included the States of Oklahoma, Arkansas, and Missouri; however, the species is presumed extirpated in Missouri.

This bat is a sensitive, cave-roosting species whose decline is thought to be caused by human disturbance of its maternal and hibernating colonies. It is

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hoped that acquisition and management of these caves will reduce human disturbance and allow the species' numbers to increase. Research on the other ecological needs of the species has been contracted to the Oklahoma Cooperative Wildlife Research Unit and is being conducted in cooperation with Regions 3 and 4.

Region 3—Dr. Gareth J. Thomas, Deputy Head of Research at the Royal Society for the Protection of Birds in the United Kingdom, recently visited the regional office to discuss toxic/non-toxic shot issues. Dr. Thomas had already conferred with FWS and other officials in Washington, and numerous State agencies and private individuals in the Midwest. He is traveling under a fellowship from the Winston Churchill Memorial Trust and hopes to acquire enough information on the steel shot issue to prepare for steel shot use in the United Kingdom.

The Consolidated Grain and Barge Company of St. Louis, Missouri, has requested an exemption from the requirements of Section 7 of the Endangered Species Act to permit establishment of a barge fleet area on the Ohio River near Mound City, Illinois. The Endangered orange-footed pearly mussel (*Plethobasus cooperianus*), located in close proximity to the proposed fleet area, could be affected by the barge company's planned activities.

A meeting was held between Minneapolis public health officials, members of the peregrine falcon (*Falco peregrinus*) reintroduction project, and an aid to the city's mayor concerning use of strychnine to control pigeons in the city. Such use could be detrimental to the peregrine reintroduction efforts there. The city agreed to discontinue the use of strychnine and will probably use netting as an alternate control method.

Lindera melissifolia (pondberry) is a 6-foot tall shrub that grows in bottomland forests only in extreme southern parts of Missouri, and 11 sites in 5 States in Region 4. The plant was proposed as Endangered on August 13, 1985. (See BULLETIN Vol. X No. 9.) The FWS recently learned from The Nature Conservancy (TNC) that a logging operator had encroached upon TNC property in Missouri and severely damaged a pond-

berry population. TNC is interested in pursuing legal action.

Region 4—Sixty days in jail and a financial loss of close to \$20,000 was the punishment one Florida man received recently for the killing of an Endangered Key deer (*Odocoileus virginianus clavium*). The Federal judge in a Key West court case recommended that the jail term be carried out at a prison farm or under a work release program. The man's financial losses included the State court fine and costs, bond forfeiture, legal fees, and confiscation of his automobile.

About 40 dead loggerhead sea turtles (*Caretta caretta*) washed ashore during October on the Pea Island NWR and adjacent National Seashore Recreation Area in North Carolina. Most of these mortalities are thought to have resulted from turtles being caught and entangled in shrimp trawls. If this is the cause, there is an urgent need for use of the trawling efficiency device (TED), which excludes sea turtles from trawl nets.

The Puerto Rico Department of Natural Resources (DNR) took a significant step toward improved Endangered species management with passage of its *Regulation to Govern the Management of Threatened and Endangered Species in the Commonwealth of Puerto Rico*. This regulation, which went into effect September 28, 1985, provides full Commonwealth protection for all federally listed species and other species considered threatened or endangered in Puerto Rico. Passage of this regulation enabled the DNR to enter into a full cooperative agreement with the FWS under Section 6 of the Endangered Species Act. Projects to be undertaken under this new agreement include recovery efforts for the Puerto Rican parrot (*Amazona vittata*), Puerto Rican plain pigeon (*Columba inornata wetmorei*), yellow-shouldered blackbird (*Agelaius xanthomus*), Culebra Island giant anole (*Anolis roosevelti*), Monito gecko (*Sphaerodactylus micropithecus*), and hawksbill sea turtle (*Eretmochelys imbricata*).

The Florida Power and Light Company (FPL) has received final approval from the South Florida Water Management District to drill three artesian wells at its Fort Myers power plant. These wells, to be completed by December 15, will provide a backup source of warm water for manatees (*Trichechus manatus*).

During the winter of 1984-85, a maximum of 338 manatees were observed at the Fort Myers power plant and the nearby Caloosahatchee River. Proposed changes in the plant's operation schedule last winter and a resulting reduction in the warm water discharged from its cooling facilities led to concern for the wintering manatees, which are vulnerable to cold water temperatures. Subsequently, FPL made a decision to temporarily run the power plant during critical cold periods of the 1984-85 winter for the primary benefit of the manatee. It is hoped that the artesian wells will provide acceptable warm temperatures and a more economical solution to meet the needs of this Endangered species.

The spring pygmy sunfish (*Elassoma* sp.), a Category 1 listing candidate, appears to be alive and well following transplant efforts last year initiated in the vicinity of an extirpated historical site in Limestone County, Alabama. On September 13, 1985, John J. Pulliam III of the FWS Endangered Species Field Station in Jackson, Mississippi, and Dr. Maurice F. (Scott) Mettee of the Alabama Geological Survey were successful in collecting one male and three females, all juveniles, from Pryor Spring #2, site of the 1984 transplant. Pryor Spring #2 is adjacent to Pryor Spring #1, which was one of only two known historical sites but is now unoccupied by the fish. Also, an additional 120 fish were collected on September 13 from Moss Spring, the other known historical site, and released into Pryor Spring #2 to bolster the new population. Moss Spring is currently protected under a Conservation Agreement with the landowner.

Jamesianthus alabamensis (Alabama jamesianthus) was one of the candidate plant species for which field work was conducted by the Jackson, Mississippi, Field Station botanist last fall. This member of the aster family is endemic to a small area in northwestern Alabama, where it may occur along banks of first- and second-order streams. Several additional populations were located within its narrow range during the survey. Most of the populations observed appeared healthy and vigorous; however, many sites showed evidence of disturbance from cattle grazing and trampling. Additional field work will be conducted to determine the plant's rarity and to accurately assess the threats to its survival.

Jacksonville Endangered Species Field Station biologists recently undertook a field investigation to determine if habitat still remains at three sites in Lake

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County, Florida, which were known to contain populations of the rare plant, *Warea amplexifolia* (wide-leaf warea). This plant, a member of the mustard family, is a Category 1 listing candidate. It was last surveyed in 1979 when populations were found to occur at only four sites in Florida (three in Lake County and one in Polk County).

The Polk County site was relocated in 1984 and found to be still supporting a *W. amplexifolia* population. The three Lake County sites also were located, but one had been completely destroyed by construction of several commercial establishments. The two other sites were found to still contain suitable habitat for the plant, and one is now protected as part of the Lake Griffin State Park. Unfortunately, the biologists were not able to find specimens of *W. amplexifolia* actually growing at either site, although this may have been because the season was too advanced. The warea, which is an annual plant, probably had already completed its flowering and seeding and died earlier in the year. The fact that suitable habitat remains makes it likely that both sites still support populations of this species.

Region 5—Endangered Species Office personnel in Regions 4 and 5 have been working together to determine the cause of mussel die-offs in the Powell River in Virginia and Tennessee. Several Endangered mussels occur in this river, and their survival is being threatened by some unknown cause.

The Region 5 staff is conducting a nationwide consultation for the Environmental Protection Agency on the registration of the pesticide Diazinon to determine possible adverse effects on federally listed and proposed species. All FWS regional offices have been contacted for input.

Region 6—In last month's BULLETIN, it was reported that black-footed ferrets (*Mustela nigripes*) were being held in captivity at two research centers in Wyoming and that they were having problems with canine distemper. The current status of the captive population is one healthy ferret (female) and two sick ferrets (one male, one female) at the original research facility, and six healthy ferrets (four females, two males) at the other location.

Land and air survey crews are taking advantage of recent snows to observe

black-footed ferret tracks to determine the number of ferrets still alive in the original colony near Meeteetse, Wyoming. Ferret sign should become more abundant in December after prairie dogs go into hibernation. Ferrets do not make abundant trenches that can be easily seen from the ground and air on snow until after prairie dogs begin hibernation.

The American Peregrine Falcon Recovery Plan was revised recently. The original plan, which covers the Rocky Mountain Southwest populations, was approved in 1977. The revision was completed to update the goals, implementation schedule, and data contained in the plan based on the most current information. Copies of the revised American Peregrine Falcon Recovery Plan can be obtained from the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852 (800-582-3421).

Region 7—On November 6, 1985, the Environmental Protection Agency signed an experimental use permit authorizing use by the FWS of the toxicant Compound 1080 to eradicate introduced Arctic foxes (*Alopex lagopus*) from remote, uninhabited Kiska Island.

This action will promote the recovery of the endangered Aleutian Canada goose (*Branta canadensis leucopareia*), which once nested on this and many other Aleutian Islands.

The FWS appreciates the support received from groups such as the Pacific Flyway Council, the Pacific Seabird Group, the National Audubon Society, and the American Wilderness Alliance. Although some have spoken out against this program, the FWS is greatly encouraged by the overwhelming support from a concerned and knowledgeable public that realizes Arctic foxes are ecologically damaging and out of place in these island ecosystems where marine birds and waterfowl have evolved in the absence of mammalian predators. It is hoped that, in the near future, Kiska will once again be home to nesting Aleutian geese and many other species of migratory birds.

Region 8 (Research)—A manatee, released after 5 years of captive rehabilitation at various oceanaria in Florida, was successfully tracked by satellite telemetry in both freshwater and saltwater habitats in spring 1985. The floating radio transmitter, attached by a belt, was monitored by Denver Wildlife Research Center's Sirenia Project biologists and cooperators via polar-orbiting satellites

belonging to the National Oceanic and Atmospheric Administration. The manatee joined wild individuals and traveled within Florida from its release point in the Homosassa River to preferred habitat at the mouth of the Suwannee River. This kind of seasonal movement is typical of manatees from the area.

This study demonstrates that rehabilitated manatees can be successfully reintroduced into the wild. Additionally, the satellite-monitored location data provided important habitat information to the Jacksonville, Florida, Endangered Species Office in considering ongoing Endangered Species Act Section 7 responsibilities for the mouth of the Suwannee River.

The drastic decline in the native fauna of Guam in recent years has resulted in the listing of seven Guam birds as Endangered. (See BULLETIN Vol. IX No. 9.) The biggest threat to their survival and recovery is the brown tree snake (*Boiga irregularis*). This introduced species apparently arrived soon after World War II, and in the absence of predators has undergone a population explosion, resulting in the crash of native bird and mammal populations on which it feeds.

Research biologists with the Denver Wildlife Research Center's Herpetological Studies Project initiated work in June 1985 to develop ways to control the snake population and to devise a strategy for preventing the spread of the snake to other islands where it could cause similar ecological damage. Emphasis of work to date has been on determining actual densities of snakes in various bird habitats on Guam, developing traps and attractants for capturing snakes, and evaluating a variety of control techniques that could be used to lower snake predation on island birds. No ready solution currently exists for control of this snake; further research is needed.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works *only* for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service *will not* deliver it.

New Publications

The Rare Vascular Plants of British Columbia (Syllogeus No. 59) by Gerald B. Straley, Roy L. Taylor, and George W. Douglas, has just been published by the National Museum of Natural Sciences in Ottawa, Canada. Information on 816 rare plants is presented in the form of an annotated list. Cited references, herbaria consulted, the total range for each taxon, the range in British Columbia, the biogeoclimatic zone and habitat in which each taxon is found in the province, and distribution maps for the rarer taxa are included. Copies may be obtained free of charge by writing to: Rare and Endangered Plants Project, National Museum of Natural Sciences, Ottawa, Ontario, Canada K1A 0M8.

Similar lists of rare vascular plants have been published by the National Museum of Natural Sciences for Alberta, Manitoba, New Brunswick, Nova Scotia, Quebec, Saskatchewan, and the Yukon, and some are still available. Also, the *Atlas of the Rare Vascular Plants of Ontario* is nearing completion, with 3 of the 4 installments now published. Part 4 should be available in fall 1986. Order the *Atlas* and/or any of the other provincial rare plant lists free of charge from the above address.

The *Audubon Wildlife Report*, designed to be a comprehensive reference guide to Federal wildlife management laws, programs, and agencies, is available

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	19	234	4	0	22	304	23
Birds	60	13	141	3	1	0	218	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	19	3	0	74	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	10
Plants	86	5	1	23	2	2	119	43
TOTAL	258	47	458	71	10	37	881	220**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, and leopard.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 185

Number of species currently proposed for listing: 28 animals
30 plants

Number of Species with Critical Habitats determined: 91

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

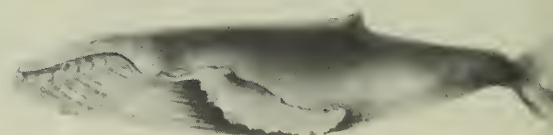
November 30, 1985

ble from the National Audubon Society. Included in the 650-page volume are individual accounts on a number of Threatened and Endangered species, many of them written by Fish and Wild-

life Service biologists. Copies of the report can be purchased for \$16.50 (postpaid) from the National Audubon Society, 950 Third Avenue, New York, New York 10022.

NMFS Whale Report

Copies of "The Status of Endangered Whales," a review of knowledge about whale distribution, migration, life history and ecology, exploitation, abundance, and management, are available from the National Marine Fisheries Service (NMFS). The 64-page, illustrated report consists of separate papers on the eight listed whales, along with an introductory overview, and appeared in the *Marine Fisheries Review* (46(4), 1984). Free copies of the report can be obtained from the Protected Species Division, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Washington, D.C. 20235.



Humpback Whale (*Megaptera novaeangliae*)

Drawing by Evelyn Ficzyuk

December 1985

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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ENDANGERED SPECIES

Technical Bulletin Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Listings Proposed for a Bird and Three Plants

During December 1985, the Fish and Wildlife Service (FWS) proposed adding a bird and three plants to the Federal List of Endangered and Threatened Wildlife and Plants. If the proposals become final rules, Endangered Species Act protection will be extended to the following taxa:

Florida Grasshopper Sparrow (*Ammodramus* *savannarum* *floridanus*)

Grasshopper sparrows (*Ammodramus* *savannarum*) are found throughout much of temperate North America. The Florida subspecies (*A. s. floridanus*), however, is restricted in range and is geographically isolated from others of the species by at least 310 miles (500 kilometers). It occurs only in parts of Florida's south-central prairie region that retain the specific habitat characteristics required by this subspecies.

Unlike the other two *A. savannarum* subspecies found east of the Rocky Mountains, the Florida grasshopper sparrow does not migrate. It also needs

a different kind of habitat; while most grasshopper sparrows seem to prefer open, grassy areas, the Florida subspecies inhabits the stunted growth of saw palmetto, dwarf oaks, bluestems, and wiregrass. A low, sparse growth of these plants, rather than sod-forming grasses, apparently is needed by this ground-nesting bird.

In the early 1900's, populations of Florida grasshopper sparrows reportedly were large and widespread; however, surveys conducted between 1980 and 1984 indicate that the bird has declined in numbers and range. The total population of this subspecies may consist of fewer than 250 adults at 9 scattered sites. Accordingly, the FWS has proposed to list the Florida grasshopper sparrow as Endangered (F.R. 12/18/85).

Conversion of native grasslands to improved pastures is the greatest threat to its survival. Apparently the sparrows can tolerate some alteration in vegetation composition and structure, but they cannot adopt to the conditions that result from intensive pasture management. Grasshopper sparrows have been found *only* in areas that retain at least some of the plants mentioned above.

Areas managed for grazing by mechanical clearing or by prescribed burns during winter (at intervals of 2 to 3 years) provide suitable habitat because native prairie grasslands are maintained at an early successional stage. Dense vegetation and accumulated litter probably preclude effective foraging by the Florida grasshopper sparrow.

The Florida grasshopper sparrow occurs on private land, two State wildlife management areas (Three Lakes WMA in Osceola County and Fisheating Creek in Glades County), and the U.S. Air Force's Avon Park Bombing Range (of which inactive sections are leased for cattle grazing). It is not known if grasshopper sparrows live directly within the bombing range target areas, but the Air Force is aware of their possible presence and already considers their needs when making habitat decisions on the range. If the Florida grasshopper sparrow is listed, the Air Force will be required to consult with the FWS on any of its activities that may affect the bird.

Comments on the proposal to list the Florida grasshopper sparrow as Endangered are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207 by February 18, 1986.

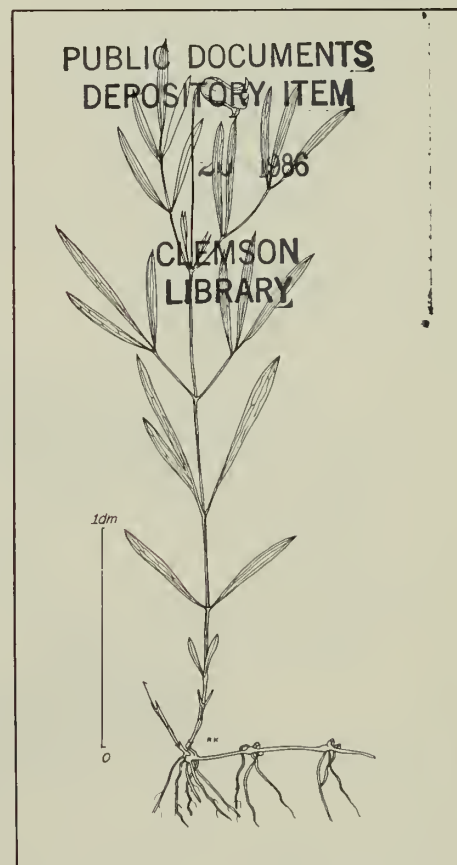
Alabama Leather Flower (*Clematis* *socialis*)

One of Alabama's rarest plants, *C. socialis* is known to occur at only two small sites on and adjacent to highway rights-of-way. Certain roadside maintenance practices and potential land use changes threaten the species' survival,

(continued on page 6)

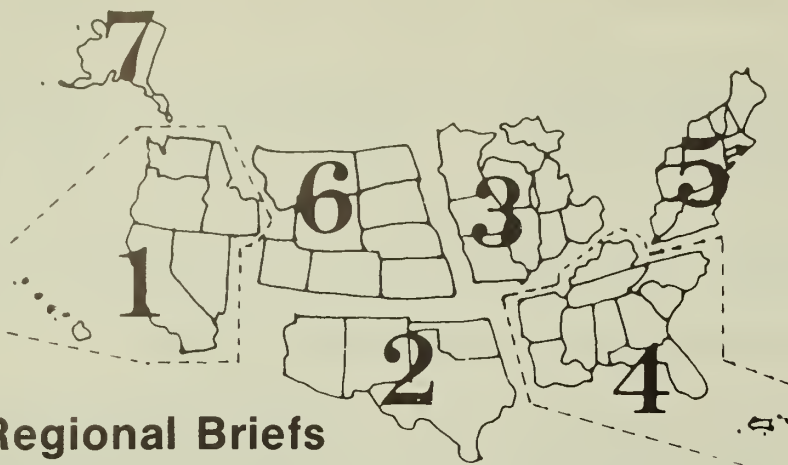


The Florida grasshopper sparrow gets its common name from its song, which resembles the sound made by grasshoppers.



Alabama leather flower (*Clematis* *socialis*)

drawing by Robert Kral



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of December:

Region 1—The fall 1985 (Oct. 28 - Nov. 2) southern sea otter (*Enhydra lutris nereis*) count has been reviewed and summarized. The total is the lowest

recorded to date since the current survey methods were employed in spring 1982; however, it does not vary significantly from the mean of the first six surveys. The total count for fall 1985 was 1,221 otters—1,066 independent animals and 155 pups.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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Information on the life history, habitat requirements, and status of the cui-ui (*Chasmistes cujus*) was provided to the Pyramid Lake Paiute Tribe during two recent meetings. The meetings were open forums for tribal members, along with their attorney, to debate the merits of the proposed Truckee River Settlement Bill of 1985, which was proposed to end 70 years of water use conflicts in the Truckee/Carson River systems. Although the Tribe voted one week later to oppose the bill, they also voted to continue negotiations. Results of these negotiations could significantly influence the restoration and possible recovery of the Endangered cui-ui.

Region 2—On December 18-19, an ABC-TV film crew visited Aransas National Wildlife Refuge (NWR) in Texas and filmed footage for a 5-minute special program segment on the Endangered whooping crane (*Grus americana*). The segment aired at the close of the evening national news broadcast on December 26. It was part of a 5-part series focusing primarily on Endangered species; other featured species included the California condor (*Gymnogyps californianus*), bald eagle (*Haliaeetus leucocephalus*), and Florida panther (*Felis concolor coryi*).

As of January 6, 1986, the number of whooping cranes wintering at Aransas NWR remained at 94.

Dr. Rod Drewien, a University of Idaho researcher working under contract with the FWS, located 30 whooping cranes wintering in New Mexico in December, and he believes the Rocky Mountain population now includes up to 35 individuals.

The Region 2 Endangered Species Office recently received authorization from the Mexican government to import up to 50 wild masked bobwhite (*Colinus virginianus ridgwayi*). These birds will be used to supplement the captive population of bobwhites currently held for propagation at the Patuxent Wildlife Research Center in Maryland. The offspring of these newly captured bobwhites will be reintroduced at the Buenos Aires NWR in southern Arizona over the next 2 years. Some of these offspring will also be sent to Mexico for display in that country's zoological facilities. The newly captured bobwhites will greatly improve the genetic diversity of the bobwhite population in the United States, thus helping to prevent inbreeding.

Dexter National Fish Hatchery in New Mexico had an excellent year for producing, stocking, and holding Threat-

(continued on page 10)

Three Animals Added to List of Endangered and Threatened Wildlife

During the month of December, Endangered Species Act protection was given to the following three species:

Piping Plover

The piping plover (*Charadrius melodus*) is a small, stocky shorebird that weighs from 1.5 to 2 ounces (42 to 64 grams), reaches about 7 inches (17 centimeters) long, and has a wingspread of approximately 15 inches (35 cm). Both male and female birds are similar in size, and both are colored pale brown on their upper parts and white on their underparts. A dark band encircling its body below the collar and a dark stripe across the forecrown are distinguishing marks on adults in summer, but obscure in winter.

Piping plovers breed on the northern Great Plains, around the Great Lakes, and along the Atlantic coast. They occupy their breeding grounds from late March to August, nesting on sandy beaches along the ocean and inland lakes; on dredge and alluvial islands in rivers; and on salt-encrusted bare areas of sand, gravel, or pebbly mud on interior lakes and ponds. The nests themselves are shallow, scraped depressions that are sometimes lined with pebbles, shells, or other debris, and usually contain four eggs. When the breeding season ends, the shorebird winters along the Atlantic and Gulf of Mexico coasts from North Carolina to Florida, and in the Bahamas and West Indies.

By 1900, the piping plover, which was once described as a common resident on the beaches of the Atlantic coast, had been greatly reduced by year-round shooting. In some areas on the coast, the plover was close to extirpation. With the protection of the Migratory Bird Treaty Act, however, the species had recovered by the 1920's and was once again considered common. Since that time, the piping plover population again has decreased throughout most of its range, and it has vanished as a nesting species from many areas, most dramatically in the Great Lakes region. Where breeding does occur, it is curtailed primarily because of foot and vehicular traffic on the coastal beaches, which destroys nests and young.

Much of this bird's historical riverine habitat has been destroyed or modified by water development projects. Damming and channelization of rivers have reduced nesting habitat by eliminating sandbars along hundreds of miles of rivers in the Dakotas, Iowa, and Nebraska. Untimely water releases from dams subject remaining sandbar habitat to altera-

tion and flooding during the breeding season. The damming and withdrawal of water for irrigation and other agricultural purposes have reduced water flows in rivers such as the Platte River which has, in turn, led to dense vegetation growth that is less suitable for nesting plovers. In addition to extensive breeding area problems, the continual loss and modification of wintering habitat is also a significant threat to *C. melodus*.

On November 8, 1984, the Fish and Wildlife Service (FWS) published a proposed rule in the *Federal Register* to add the piping plover to the List of Endangered and Threatened Wildlife. (See story in BULLETIN Vol. IX No. 12.) Since the overall range of the piping plover has decreased considerably, and modification and destruction of its habitat continues, the FWS made a final determination on December 11, 1985, to list the species throughout its range. In the Great Lakes region, the bird is now listed as Endangered and in the remainder of its range (northern Great Plains, Atlantic coast, Gulf coast, Bahamas, and West Indies) as Threatened. Endangered status seems appropriate for piping plovers in the Great Lakes region because the species is near extirpation there; Threatened status is warranted for those in the remainder of its range due to the species' low numbers and the continual threats to its survival.

Critical Habitat for the piping plover was indeterminable at the time of the final rulemaking, mostly because of the often ephemeral nature of the species' nesting habitat. For example, beaches and interior wetlands may not be used by plovers each year because of varying water levels or natural changes in beach

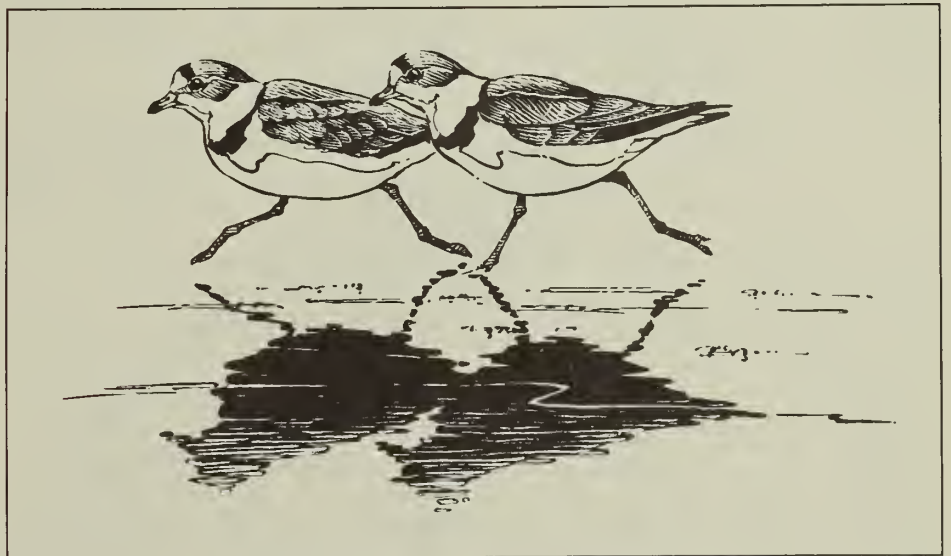
characteristics, and nesting sandbars may disappear.

Desert Dace

The desert dace (*Eremichthys acros*) is a fish endemic to a series of thermal spring habitats in the Soldier Meadows area of Humboldt County, Nevada, where it was discovered in 1939 and has apparently survived for at least tens of thousands of years. The desert dace is the only member of its genus and is characterized by the presence of prominent horny sheaths on its jaws which help the fish to scrape algae and other aquatic organisms from rock substrate. No other cyprinid possesses such a remarkable feeding adaptation. Noted for its high temperature tolerance, these fish typically occur in water ranging from 67° to 97° F, but have been observed in water as hot as 100.4° F. Water temperature appears to be a major factor controlling the distribution of desert dace within a spring system; when temperatures at a springhead exceed 100° F, desert dace are restricted to the somewhat cooler outflow downstream from the springs.

Most of the thermal springs and outflow creeks inhabited by *E. acros* occur on private lands where the landowner has modified much of the species' habitat by diverting outflow water away from the natural channels into manmade ditches. These diversions, made for agricultural purposes, are especially detrimental in spring systems where the head pool temperature far exceeds 100° F and cannot be tolerated by the dace. The species can then only occupy the out-

(continued on page 4)



Disturbance and habitat loss have reduced the piping plover to approximately 2,200 breeding pairs in the U.S. and Canada.

Three Animals

(continued from page 3)

flow creeks; the manmade ditches do not provide suitable habitat. Exotic fish that have been introduced into an area close to springs and outflows inhabited by desert dace may pose further threats to the species through competition and predation on the dace, and through the introduction of diseases and parasites.

The Soldier Meadows is designated as a Known Geothermal Resource Area, and geothermal exploration occurred there several years ago. If exploration and development are resumed, these activities could impact the desert dace by interfering with the aquifers that supply water to thermal springs in the area.

The FWS proposed to list the desert dace as Threatened on May 29, 1984. (See BULLETIN Vol. IX No. 6.) After a thorough review of all available information, *E. acros* was listed in a final rule published in the December 10, 1985, *Federal Register*. A designation of Critical Habitat was included as part of the final rule for all thermal springs and their outflows located within an area approximately 4 miles long and 1.0-2.7 miles wide in the Soldier Meadows region of Humboldt County, Nevada. (See final rule for a more complete description.) The quality and quantity of water in the pools and outflow streams designated as Critical Habitat for the desert dace are the most important factors in its conservation. Aquatic habitat modification, grazing and leasing of lands for geothermal exploration and/or development could result in adverse modification of desert dace habitat.

Guadalupe Fur Seal

The primary responsibility for the Guadalupe fur seal (*Arctocephalus townsendii*), as well as most other marine mammals, lies with the National Marine Fisheries Service (NMFS), Department of Commerce. On January

3, 1985, NMFS proposed to list the Guadalupe fur seal under the Endangered Species Act as a Threatened species. (See BULLETIN Vol. X No. 2.) Population numbers of this small to medium-sized seal once were estimated to be at least 30,000, but by the mid-19th century, commercial exploitation reduced the seal population to extremely low numbers. Recent surveys indicate that the total breeding population consists of approximately 1,600 animals and is likely restricted to the eastern shore of Guadalupe Island, Mexico. A few non-breeding individuals have been sporadically sighted in southern California waters near the Channel Islands.

Although the breeding population of *A. townsendii* is slowly growing, several actions have been proposed within the species' range that have the potential to modify or degrade portions of its habitat. Offshore oil and gas development activities are intensifying in central and southern California waters, and large amounts of spilled oil could affect individual fur seals. They rely on their thick pelage for insulation from the cold marine environment, and contact with oil can damage the fur's insulating qualities. Another potential impact could result from the U.S. Air Force's Space Shuttle Program. Launches over California are predicted to cause high intensity sonic booms that could cause short-term disturbance to seals. In addition, disturbance to seals breeding and resting on Guadalupe or San Miguel Island by tourists and fishing vessels may also potentially threaten *A. townsendii*.

The Guadalupe fur seal has been protected in the United States under the provisions of the Marine Mammal Protection Act since December 21, 1972. With the final listing rule (F.R. 12/16/85), the Endangered Species Act of 1973 will provide the species with additional protection. Critical Habitat was not designated as part of the final rule because the only areas that meet the requirements for such a designation are outside of U.S. jurisdiction.

Available Conservation Measures

As Endangered and Threatened species, the piping plover, desert dace, and Guadalupe fur seal now receive the protection authorized by the Endangered Species Act. Among the conservation measures provided to listed species are recognition of their precarious status, possible Federal funding for State conservation programs, recovery actions, and prohibitions against certain practices.

The prohibitions, in part, make it illegal to engage in interstate or international trafficking in listed species without a permit. For the fur seal and for the plover population listed as Endangered, standard prohibitions against take are now in effect. For the desert dace and the remaining populations of the piping plover, which are listed as Threatened, the protection measures are effectively the same, except that a broader category of permits is available. However, the Threatened listing of the desert dace includes a special rule that allows for take of the species as necessary and advisable for its conservation. Such taking is allowed without a Federal permit only if a State collection permit is obtained and all State wildlife regulations are satisfied. Taking under this special rule is allowed only for scientific, propagation, educational, or other purposes consistent with the Endangered Species Act.

Under Section 7 of the Act, Federal agencies are required to consult with the FWS to ensure that any actions they authorize, fund, or carry out will not jeopardize the survival of any listed species or adversely modify their Critical Habitat. These Section 7 regulations apply even when Critical Habitat has not been designated. Federal agencies that may be affected by the listing of the piping plover are the U.S. Army Corps of Engineers and the Bureau of Reclamation. With respect to the desert dace, Section 7 provisions may affect the Bureau of Land Management in the administration of its portion of the Critical Habitat area.

Effort to Capture Wild Condors is Suspended

A recent effort by the Fish and Wildlife Service to take all of the remaining wild California condors (*Gymnogyps californianus*) into captivity was halted January 9 for 20 days under a temporary restraining order won in Federal court by the National Audubon Society. If the capture effort is later reinitiated and completed, all 26 currently surviving condors will be located in captive breeding programs in Los Angeles and San Diego zoos, where biologists are attempting to promote condor reproduction without the risk of further deaths

in the wild. Six condors apparently died in the wild last winter.

Capture of the condors is considered a temporary measure by the FWS, which remains committed to the goal of establishing a secure, self-sustaining population of California condors in the wild.

Until recently, there were six wild condors remaining, two of them females. On January 3, 1986, the female member of the last wild pair was captured. It was found to be suffering from severe lead poisoning, probably the result of lead fragments the bird had ingested. An

examination at the San Diego Zoo revealed eight shotgun pellets embedded in one of its wings. Although these pellets did not cause the lead poisoning, they illustrate the obvious threat of wild condors being shot.

As the BULLETIN was going to press, it was learned that the recently captured female condor died on January 18, apparently from complications of lead poisoning. The February BULLETIN will provide further information.

Refuge Established for Endangered Hawaiian Forest Birds

by Peter A. Stine
Honolulu, Hawaii, Field Office —
Environmental Services

The Fish and Wildlife Service (FWS), in cooperation with The Nature Conservancy of Hawaii and the Hawaii Department of Land and Natural Resources has completed the purchase of 8,300 acres of native forest land on the island of Hawai'i. This is the first phase of the effort to establish a 33,500-acre Hakalau Forest National Wildlife Refuge for the long-term conservation of Endangered Hawaiian forest birds. Establishment of this refuge has been a high priority for endangered species conservation nationwide. The refuge area is located on the northwestern slope of Mauna Kea and is primarily rain forest, with some of the finest koa (*Acacia koa*)-'ohi'a (*Metrosideros collina*) and 'ohi'a forests remaining in the Hawaiian Islands.



Hawai'i 'akepa (*Loxops coccineus coccineus*)

Identification of the Hakalau area for refuge acquisition followed 7 years of research to assess the status and distribution of native Hawaiian forest birds. The FWS, with the assistance of the Hawaii Division of Forestry and Wildlife, conducted extensive surveys throughout forested lands on the islands of Hawai'i, Maui, Kaua'i, Lana'i and Molo-

ka'i. The Hakalau area was found to support some of the largest and most significant remaining populations of both Endangered and more common native forest birds in the State. The bird species include the Endangered 'akiapola'au (*Hemignathus munroi*), Hawai'i 'akepa (*Loxops coccineus coccineus*), Hawai'i creeper (*Oreomystis mana*), Hawaiian hawk or 'io (*Buteo solitarius*), and 'o'u (*Psittirostra psittacea*), and large populations of other native forest bird species still present on the island of Hawai'i.

Although the primary purpose of this refuge is for conservation of Endangered Hawaiian forest birds, it will also maintain habitat for many other unique Hawaiian plants and animals, as well as protect a vital watershed. The Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the State's only native terrestrial mammal, also occurs on the Hakalau area. Among the rare plants known from the refuge area are the following Category 1 candidates for listing as Threatened or Endangered: *Clermontia lindseyana*, *Clermontia pyralaria*, *Cyanea fernaldii*, *Cyanea shipmanii*, *Gouldia terminalis* var. *quadrangularis*, and *Platydesma remyi*.

The FWS soon will begin development of a comprehensive management plan to deal with the most significant and immediate threats to the maintenance of this native forest ecosystem. Management and research actions will emphasize maintaining and, where necessary, restoring the native koa-'ohi'a forest. The FWS will work closely with the State and county to ensure that the final plan addresses mutual land use and conser-



'akiapola'au (*Hemignathus munroi*)

vation objectives. Accommodation of compatible uses of the area, such as various public uses, will also be considered.

The FWS and The Nature Conservancy of Hawaii plan to continue their efforts to complete the entire Hakalau Forest National Wildlife Refuge. In addition to the Hakalau Forest Refuge proper, discussions are in progress on a proposal to manage this area and the adjoining State-owned Conservation District and Natural Area Reserve lands as one contiguous koa-'ohi'a/'ohi'a rain forest ecosystem.

Realization of these goals will result in a major step toward recovery for a number of Endangered species in Hawaii.



'o'u (*Psittirostra psittacea*)

from a lithograph by F. W. Frohawk

from a lithograph by F. W. Frohawk

Proposed Listings

(continued from page 1)

prompting the FWS to propose listing it as Endangered (12/6/85).

The Alabama leather flower is a perennial herb that forms dense clumps of clonal stems from rhizomes. It reaches 7 to 12 inches (18 to 30 centimeters) in height. During April to May, the plant bears solitary, blue-violet flowers shaped like urns or bells. *C. socialis* is thought to have excellent horticultural potential.

One population occurs on a roadside right-of-way and an adjacent privately owned woodland in St. Clair County. It consists of fewer than 50 clones and is restricted to less than one acre (0.4 hectare). The second population, found in Cherokee County, contains only a few clones and it also grows on a roadside right-of-way. Due to its proximity to highways, *C. socialis* has suffered repeated disturbances from such roadside maintenance techniques as herbicide application, mowing, and scraping. The St. Clair County population recently lost some leather flowers from mechanical disturbances when diseased pines were removed from the site. Encroaching residential development also threatens the habitat of this population.

There are no known Federal activities that would jeopardize the survival of *C. socialis*. Since being informed about the presence of this rare plant, both the Alabama Highway Department and the private landowner have expressed an interest in cooperating with the FWS on conservation of the species. A Federal listing of the Alabama leather flower would enhance and reinforce any protective measures taken.

Comments on the proposal to list *C. socialis* as Endangered are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by February 18, 1986.

Prairie Bush-clover (*Lespedeza leptostachya*)

A native of the midwestern United States, the prairie bush-clover has always been rare and localized in distribution. Currently, it is known to exist at about 24 sites scattered throughout southern Minnesota, western Wisconsin, northern Illinois, and northern and south-central Iowa. Certain agricultural practices and unfavorable vegetational changes are destroying its native prairie habitat. In an effort to prevent its extinction, the FWS has proposed to list the prairie bush-clover as a Threatened species (F.R. (12/6/85).



The prairie bush-clover (*Lespedeza leptostachya*) grows up to 40 inches (one meter) high, has narrow compound leaves, and produces spikes of 15 to 30 white to light purple flowers.

L. leptostachya inhabits dry to mesic native prairies that are well-drained, often gravelly, and located on kames or eskers (hills of glacially deposited material) and river terraces. A colonizer of open habitats, the species is adapted to the frequent occurrence of fire. Although it has always had a limited distribution, the prairie bush-clover survives in only a fraction of its historical range. Most of its habitat has been eliminated by agricultural activity, but other threats include quarrying, highway widening, and residential development.

The four States in which the prairie bush-clover is found officially list it as threatened or endangered under their own conservation programs, and give it varying forms of protection against taking and trade. Some of the habitat is protected as well. The largest *L. leptostachya* population, consisting of about 2,000 plants, is located within Minnesota's Kilen Woods State Park. Two other prairie bush-clover sites in Minnesota are owned by the Minnesota Historical Society and a private college. In Wisconsin, two sites are on land owned

either by The Nature Conservancy (TNC) or the Wisconsin Department of Natural Resources. Most of the Iowa populations are contained within State preserves, and one Illinois site is owned by the Illinois Department of Transportation. The Federal Endangered Species Act will supplement this existing habitat protection if the proposed listing is made final.

Comments on the proposal to list the prairie bush-clover as Threatened are welcome, and should be sent to the Endangered Species Coordinator, U.S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111 by February 4, 1986.

Jesup's Milk-vetch (*Astragalus robbinsii* var. *jesupi*)

The most vulnerable of two remaining *Astragalus robbinsii* varieties in New England, the Jesup's milk-vetch is known from only three sites along the Connecticut River in New Hampshire

and Vermont. A potential hydroelectric project and increased recreational activity could jeopardize its survival, and the FWS has recommended listing *A. r. var. jesupi* as Threatened (F.R. 12/19/85).

This perennial herb, a member of the pea family (Fabaceae), grows from rhizomes in the silt-filled crevices of calcareous schist outcrops found along the river. The riverbank ecosystem provides conditions essential to Jesup's milk-vetch growth and reproduction. High spring flows annually scour the rock outcrops and deposit nutrient-rich sediments. Shade provided by the mature hardwood trees growing at the tops of the riverbanks is another important factor in the plant's survival.

The Jesup's milk-vetch was first discovered along the Connecticut River near Hartland, Vermont, in 1881. Many early collections were taken at this site, and the population now consists of fewer than 75 plants. A population at Sumner's Falls near Plainfield, New Hampshire, numbers only six plants, and the most vigorous colony, of several hundred plants, occurs downstream of Claremont, New Hampshire. This unique corridor along the Connecticut River provides habitat for not only the Jesup's milk-vetch, but for two other candidates for Federal listing, the dwarf wedge mussel (*Alasmodonta heterodon*) and the cobblestone tiger beetle (*Cicindela marginipennis*). Fifteen plant species considered by the New Hampshire Natural Heritage Program as being rare, threatened, or endangered also occur along this stretch of river, which the Program identifies as "the most significant natural area in the State of New Hampshire in need of conservation."

Available Conservation Measures

If the proposals to list the above bird and plants are made final, these species will receive all the protection authorized under the Endangered Species Act. Among the benefits would be the require-

ment for the FWS to develop and implement recovery plans, the possibility of Federal aid to States with approved Endangered Species Cooperative Agreements, protection from jeopardy resulting from actions involving the Federal Government, and prohibitions against certain activities.

The Act prohibits the take, possession, or transport of listed animals. For listed plants, the rules are different; the ban on removing Endangered or Threatened plants applies only to those found on lands under Federal jurisdiction. None of the plants proposed for listing during December 1985 are known to occur on Federal lands.

Protection from harmful trade, however, applies for listed animals and plants. The Act prohibits interstate or international trafficking in listed species, except under Federal permit. Seeds from cultivated specimens of Threatened plants are exempt from trade prohibitions if containers display a statement of "cultivated origin."

Critical Habitat designations were not proposed for any of the above species. The Florida grasshopper sparrow is an animal that moves around frequently in order to take advantage of the changing mosaic of suitable habitat; therefore, Critical Habitat for this bird is not determinable. With regard to the plants, pinpointing their locations with a Critical Habitat designation could make them more vulnerable to vandalism or collecting. Nevertheless, if these species are listed, they will receive protection under Section 7 of the Endangered Species Act. Federal agencies will be required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. If an agency finds that one of its actions may affect such a species, it must consult with the FWS on ways to avoid jeopardy.

Two of the remaining Jesup's milk-vetch populations are small, easily accessible, and occur in areas where there is heavy recreational use. Sumner's

Falls, in particular, is a scenic area heavily used for canoeing, fishing, picnicking, sightseeing, and other activities. With the increasing demand for recreational opportunities, inadvertent trampling of the few remaining plants is a major concern.

The most significant threat to the plant, however, is direct inundation or alteration of its habitat by future hydro-power projects. The Federal Energy Regulatory Commission (FERC) issued a preliminary permit to a private developer for a 20 megawatt dam that would have destroyed two of the three populations and possibly harmed the third. Preliminary permits do not authorize the construction of a project, but grant the permittee exclusive rights to conduct studies on the feasibility of the project at the specified site.

The FWS notified FERC in November 1984 that the proposed project would have "substantial environmental impacts that will be difficult or impossible to mitigate . . ." and that it would "oppose issuances of a license . . ." These comments were based primarily on concerns about impacts on the Connecticut River Salmon Restoration Program, the loss of important fish and wildlife habitats, and the effects on rare, threatened, and endangered species. Although the developer recently decided not to proceed with the project, other private developers are free to explore the possibility of a project at the site.

If *A. r. var. jesupi* is listed federally as Threatened, FERC will be required to consult with the FWS under Section 7 of the Endangered Species Act on any proposed issuance of a permit for project construction. Section 7 requires Federal agencies to ensure that their actions are not likely to jeopardize the survival of listed species.

Comments on the proposal to list the Jesup's milk-vetch are welcome, and should be sent to the Regional Director, Region 5, (address on page 2 of the BULLETIN), by February 18, 1986.

Hurricanes Damage Southeastern Beach Mouse Habitat

Two Choctawhatchee beach mouse (*Peromyscus polionotus allopshys*) Critical Habitat zones in Walton County, Florida, were hit hard by Hurricanes Elena (in September) and Kate (in November). In Zone 1, the Topsail Hill area, gently-sloped frontal dunes allowed the storm waters' energies to be gradually dissipated with little dune erosion. At Zone 2, including the Gayton Beach State Recreation Area, frontal dunes sustained significant damage. Escarpments of one to six feet high were evidence of serious erosion.

Alabama beach mouse (*P. p. ammobates*) and Perdido Key beach mouse (*P. p. trissyllepsis*) Critical Habitat was lost as Hurricane Elena twice passed offshore near coastal Alabama, then hit Gulfport, Mississippi, on August 30, 1985. In Alabama, estimated top wind speeds were 80 to 103 miles per hour at Gulf Shores and 131 miles per hour at Dauphin Island. The storm surge at Gulf Shores was 8.0 feet, compared to 8.4 feet at Dauphin Island.

Near the tip of Fort Morgan Peninsula, at the western edge of the Alabama

beach mouse habitat, approximately 75 percent of the primary dunes were destroyed. Remaining isolated dunes are separated from the higher relict inland dunes by a water barrier approximately 6 inches deep and 200 yards wide. Beach mice in the isolated primary dunes are subject to greater predation pressure because they now will have to forage over a greater distance, since most of the food source is gone. The tracks of foxes and cats, potential beach mice

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Hurricanes

(continued from previous page)

predators, were noted, usually leading from one isolated dune to the next. Dune restoration and predator control projects are needed in this area. Twenty percent of the man-made primary dunes east and west of the Gulf State Park Pavilion and 50 percent of the primary dunes in front of the Gulf State Park Resort Motel were destroyed. Water crossed Highway

182 after 20 to 30 percent of the dunes west of the Gulf State Park Fishing Pier were destroyed.

The eastern two-thirds of Perdido Key beach mouse habitat in Alabama received considerable damage. Twenty percent of the primary and all fore dunes were destroyed. Mouse and predator tracks were noted. Dune restoration efforts are needed, especially since this is also an area of high public use. The remaining Perdido habitat in Alabama received relatively minor damage.

In Florida, Perdido Key beach mouse habitat is unoccupied. At the Perdido Key State Preserve, the tide was out and the storm was turning when it reached the preserve. As a result, the fragile dunes were undisturbed, and an additional 50 feet of beach actually accreted. At the eastern end of Perdido Key, the Gulf Islands National Seashore, which was devastated by Hurricane Frederick in 1979, was once again breached by storm water, although the damage was not as significant as in 1979.

photo by Mike Dawson



Natural dunes in fairly good condition.



Dunes heavily damaged by Hurricane Elena; only a few remnant sea oats remain.

U.S. Delegation Reports on Fifth CITES Conference

by Art Lazarowitz
Federal Wildlife Permit Office

The Fish and Wildlife Service recently published a notice (F.R. 1/10/86) announcing the availability to the public of the *Report of the U.S. Delegation to the Fifth Meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)*.

Sixty-six of the 87 countries that were members of CITES attended the meeting held in Buenos Aires, Argentina, from April 22 to May 3, 1985. Four other countries attended as nonmember observers, as did 5 intergovernmental and 119 nongovernmental organizations. Approximately 500 people participated in the meeting. The conference selected the U.S. to be in charge of the Technical Committee and to be the North American representative on the Standing Committee.

The 10-member U.S. Delegation was led by J. Craig Potter, then Acting Assistant Secretary for Fish and Wildlife and Parks. Rolf L. Wallenstrom, Associate Director, Federal Assistance, was alternate delegation leader. The U.S. Delegation reported that it had achieved substantially all of its objectives in terms of issues involving interpretation and implementation of CITES, and most of

its objectives in terms of proposals to change the list of species controlled by CITES.

Of the 22 issues relating to interpretation and implementation, some of the more noteworthy were:

Significant trade in Appendix II species - The Conference approved a proposal to produce a list consisting of 1) Appendix II (commercially tradable) species known to be detrimentally affected by international trade and 2) Appendix II species for which there is insufficient information to make such a judgment. The list will be produced by the International Union for the Conservation of Nature and Natural Resources' Conservation Monitoring Centre, under a contract with the CITES Secretariat, with input from interested countries where the species are indigenous. The list will serve as a basis for meetings with those countries to help them introduce measures to learn more about the species and to reduce the impact of international trade on them.

Uniform Marking System for ranched specimens - In order to prevent wild specimens from being traded as ranched ones, the Conference adopted a U.S. proposal to mark all products or packages from approved ranches with a standardized mark. Marks would have to include a country code, unique identifi-

cation number, and year of production. Any marks removed during processing would have to be replaced.

Pre-convention certification - The U.S. successfully prevented a move that would have allowed Appendix II specimens in possession at the time of their uplisting to Appendix I to be traded commercially. On another topic related to pre-CITES certification, the Conference recommended that if a specimen was acquired after the date CITES applied to the specimen in the country of import, the country of import could refuse to accept the pre-CITES certificate of the country of export.

Bolivia - In response to complaints by other Latin American countries and by the CITES Secretariat that many illegally traded species were being exported or reexported from Bolivia, the Conference passed a resolution calling on Bolivia to more effectively implement CITES. Apparently in response to this, Bolivia announced to the Conference that it would extend its ban on export of live birds and other animals for an additional 90 days (to terminate in early August 1985). Bolivia stated that the problem of illegal trade was not only its responsibility, but also that of its neighbors and of those countries that import specimens from Bolivia.

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CITES Conference

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The Conference also addressed 96 proposals to effect the listing of plant and animal species. A summary of some of the more important ones follows:

1. Nile crocodile - A proposal by Malawi to transfer the whole species of Nile crocodile (*Crocodylus niloticus*) from Appendix I to Appendix II was one of the more significant issues facing the Conference. It was linked to a resolution to temporarily "relax" criteria for the transfer of certain Appendix I species to Appendix II upon approval of an export quota system. The conference accepted a modified Malawi proposal that allowed transfer of nine national populations of Nile crocodile and imposed export quotas for each population.

2. Narwhal and hooded seal - Proposals by the Federal Republic of Germany to transfer the narwhal (*Monodon monoceros*) from Appendix II to Appendix I, and by Sweden to add the hooded seal (*Cystophora cristata*) to Appendix II, were rejected by the Conference. Although the data on population status appeared to have established a marginal basis for these listings, rejection apparently was based on the active lobbying of Canada and Denmark and on the belief by some that the proposals

represented an ill advised attempt to curtail the harvest of these species.

3. Gyrfalcon - The Conference accepted a joint Denmark - Norway proposal to transfer the North American population of the gyrfalcon (*Falco rusticolus*) from Appendix II to Appendix I, reversing the action of the third meeting of the Conference (New Delhi, 1981), which transferred it from Appendix I to Appendix II. Appendix I status was sought mainly because of recent evidence of illegal trade which, it was argued, could pose a risk to other populations of gyrfalcon. The practical impact on Canada could be significant in view of plans to harvest gyrfalcons in Canada's Northwest Territories.

4. Cranes - A United Kingdom proposal to list the family Gruidae in Appendix II, with the exception of certain species or subspecies already listed in Appendix I, was accepted with the result that seven species are added to those already listed in Appendix II (including one, the sandhill crane, from the U.S.).

5. Saltwater crocodile - Australia and Indonesia proposed to transfer their populations of saltwater crocodiles (*Crocodylus porosus*) from Appendix I to Appendix II in order to allow trade in ranched specimens. The Conference readily accepted the Australia proposal and accepted the transfer of Indonesia's

Irian Jaya population under a quota system.

6. Sea turtles - Proposals to transfer ranched populations of green sea turtles (*Chelonia mydas*) to Appendix II from Appendix I were submitted by France (Reunion population), Suriname, and the United Kingdom (Cayman Islands population). In addition, proposals to transfer national populations of sea turtles to Appendix II were submitted by the Seychelles for hawksbill sea turtles (*Eretmochelys imbricata*) and by Indonesia (for green and hawksbill). The Conference rejected each of these proposals, primarily because it feared that trade could not be limited to the transferred species and would further endanger the wild populations still listed on Appendix I.

7. Australian wildflowers - As an aid to help them establish internal conservation programs, the second Conference (San Jose, 1979) accepted an Australian proposal to add various genera and species of native wildflowers to Appendix II. At the fourth Conference (Gaborone, 1983), Australia sought the removal of these plants from Appendix II, but the Conference only agreed to delist those species supported by data showing that they were not potentially threatened with extinction. At Buenos Aires, the

(continued on next page)

Regulations Proposed for Humane and Healthful Shipment of Wildlife

by Art Lazarowitz

On December 4, 1985, the Fish and Wildlife Service (FWS) proposed to regulate the conditions under which nine groups of animals can be transported into the United States. These animal groups are: nonhuman primates; marine mammals; elephants and ungulates; other large terrestrial mammals; small terrestrial mammals; sloths, bats, and flying lemurs; parrots, pigeons, passerines, and near-passerines; birds of prey; and toucans, hornbills, water birds, and large birds of non-perching habit. The proposed regulations would apply to hybrids of wild animals as well as those that have been born, bred, or raised in captivity. Wild animals that have been domesticated or tamed would also be regulated. Domestic dogs, cats, ruminants, swine, and horses, however, would not be subject to the regulations. Also excluded would be eggs and parts of wild animals, such as blood serum, tissue, and tissue culture.

Since many importers, carriers, and shippers are familiar with 1) the provisions of the Animal Welfare Act governing domestic humane transport of animals, 2) the "Guidelines for Transport and Preparation for Shipment of Live Wild Animals and Plants" developed by countries party to the Conven-

Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, Virginia tion on International Trade in Endangered Species of Wild Fauna and Flora, and 3) the "Live Animals Regulations" (guidelines developed by the International Air Transport Association), the FWS used these documents as a base from which to develop the proposed regulations.

If they are made final, the regulations will place responsibility on the carrier to refuse acceptance of animals not fit for transport and animals in containers that do not meet certain minimum standards. The cargo space of vehicles used to transport the animals into the U.S. will have to be constructed to ensure humane and healthful transport, and will have to be kept clean and be maintained to keep out engine exhaust fumes. Dangerous substances will have to be stowed in a manner that will prevent injury or inhumane conditions. While in transit, food and water requirements will have to be met. Terminal facilities for live wild animals will be required to include animal holding areas that are sanitized and that provide sufficient fresh air at appropriate temperatures.

Comments on the proposal are welcome and should be sent to the Federal Wildlife Permit Office, U.S. Fish and

Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, Virginia 22201 by February 3, 1986. (As the BULLETIN went to press, the FWS was considering extending the comment period 30 days.)



photo by Paul Gertler

The yellow-headed amazon (*Amazona ochrocephala*) is one of the most highly traded parrots. Shipment of these birds and many other animals is addressed in the proposed humane transport regulations.

CITES Conference

(continued from previous page)

Conference agreed to delist the remaining species on the basis of more extensive data and assurances that the domestic programs of research and management would be maintained.

8. Plant parts and derivatives - Article I of CITES distinguishes between parts and derivatives of Appendix I plants and parts and derivatives of Appendix II and III plants, the latter being controlled by CITES only if specifically listed in the Appendices (specification). The problem with specification is that it creates categories of coverage and noncoverage which are either difficult to define (Is a seed a whole plant or a plant part?) or which are subject to manipulation to avoid CITES controls (Is a wooden

plank included in a tree trunk specification?). At Buenos Aires, the Parties formalized a decision made at the previous conference to cover all parts and derivatives of Appendix II plants, with the following exceptions:

(1) seeds, spores and pollen (including pollenia) other than seeds of Cycadaceae, Stangeriaceae, and Zamiaceae species;

(2) tissue cultures and flaked seedling cultures;

(3) cut flowers of artificially propagated Orchidaceae species;

(4) separate leaves, and parts and derivatives thereof, of naturalized or artificially propagated *Aloe vera*;

(5) fruits, and parts and derivatives thereof, of artificially propagated *Vanilla* orchid species;

(6) parts and derivatives, other than roots and readily recognizable parts and

derivatives thereof, of American ginseng (*Panax quinquefolius*); and

(7) fruits, and parts and derivatives thereof, of naturalized or artificially propagated Cactaceae species, and separate stem joints (pads), and parts and derivatives thereof, of naturalized or artificially propagated *Opuntia* species.

A complete report on the outcome of the 96 proposals addressed at the CITES conference can be found in the June 14, 1985, *Federal Register*.

Copies of the U.S. Delegation report may be obtained from the Federal Wildlife Permit Office, Management Operations Branch, U.S. Fish and Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, Virginia 22201. Due to limited supply, requests for copies of the report should be limited to one per person or organization.

Regional Briefs

(continued from page 2)

ened and Endangered southwestern fish species. Fourteen species currently are being held at the hatchery. Fish released into the wild last year included 3,000,000 razorback suckers (*Xyrauchen texanus*), 117,000 Colorado squawfish (*Ptychocheilus lucius*), 12,600 bonytail chubs (*Gila elegans*), and 10,000 Gila topminnows (*Poeciliopsis occidentalis*). Another positive note was the detection of released razorback suckers at four different locations in Arizona.

The newly formed Desert Fishes Recovery Team held its first meeting in Tempe, Arizona. It will be responsible for drafting recovery plans for eight southwestern fish species. The FWS will also look to the team for advice concerning implementation of recovery actions for five fish species that are the subject of completed recovery plans. The team's area of responsibility will include the lower Colorado River, Rio Yaqui, and Gila River basins.

Region 3—The city of Ely, Minnesota, in St. Louis County has been tentatively selected for an international wolf center. This center, which could cost \$3-5 million, will increase public knowledge and appreciation of the controversial timber wolf (*Canis lupus*) and its complex ecosystem. The Science Museum of Minnesota's highly acclaimed "Wolves and Humans" exhibit, currently on tour throughout the country, will be a major feature of the center and will be placed there permanently.

The international wolf center will offer people the opportunity to view the wolf from many perspectives. They will be able to see its tracks in the wild and hear

its howls in the night. The center will also call attention to a variety of other North American carnivores and the many difficulties associated with their management and recovery.

The Region 3 Endangered Species Office staff hosted a meeting of northern monkshood (*Aconitum noveboracense*) researchers and resource managers on January 22-23 in La Crosse, Wisconsin. Individuals from the four States (IA, NY, OH, WI) where the species occurs were invited to participate. Intensive research and surveys have greatly increased the knowledge of the species in the 2 years since approval of its recovery plan. The meeting should improve communication among monkshood specialists and prioritize remaining recovery needs.

The research team for the Kirtland's warbler (*Dendroica kirtlandii*) left on December 11 to conduct winter field work in the Bahamas, where the birds will be fitted with radio transmitters.

An exhibit on the reintroduction of the peregrine falcon (*Falco peregrinus*) was set up in the main lobby of the regional office's Federal Building by the Bell Museum of Natural History during early December.

Region 4—On October 26, 1985, an adult male Florida panther (*Felis concolor coryi*) was hit by a car and killed on State Road 29 in Collier County, the same road where four other panthers have been killed over the past few years. The incident occurred 3 miles south of State Road 84, also known as Alligator Alley, where the animal was found in the early morning by a fisherman.

This panther had quite a history. It was first fitted with a radio several years ago in an area of Big Cypress National Preserve known as Raccoon Point. The cat

then proceeded to move across the preserve and established a new territory in the Fakahatchee Strand after killing a male panther that occupied the area. The animal then proceeded to show an interest in a female that resided near Alligator Alley.

At present, there are no known male panthers remaining south of Alligator Alley, except for a small population in Everglades National Park. In an effort to improve State Road 29, a segment of the highway north of Alligator Alley is being widened and relocated about 100 feet to the west. It is hoped that this will improve the chances for survival of animals crossing this segment of the roadway. Improvements to the remainder of the highway are planned for when funds become available.

According to recent newspaper accounts, 2,850 acres of the Topsail Hill area in Walton County, Florida, are to be sold for residential development. Topsail Hill is the site of the last remaining mainland population of the Choctaw-hatchee beach mouse (*Peromyscus polionotus allopshys*). Walton County has approved a zoning density of 35 units per acre for this fragile area. Although the area is included in a unit of the Coastal Barrier Resources System, it is expected that development needing no Federal subsidies or permits may occur. Personnel from the Jacksonville Endangered Species Field Station and the Florida Game and Fresh Water Fish Commission met in early December to discuss the potential impacts of high density residential development on beach mouse habitat.

The Gopher Tortoise Council, a group of professional biologists and other people concerned with conservation of the

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Regional Briefs

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gopher tortoise (*Gopherus polyphemus*), met in November at the Solon Dixon Forestry Center in Conecuh National Forest, Alabama. The western population of the gopher tortoise (from the Tombigbee and Mobile Rivers in Alabama to southeastern Louisiana) is scheduled to be proposed for listing as an Endangered species.

Representatives from State and Federal agencies attended the meeting, and management recommendations for longleaf pine forests, the gopher tortoise's primary habitat, were discussed. Some preliminary management principles also were formulated. After these principles are refined, the council will provide them to both public and private land managers. The U.S. Forest Service (USFS) is one major landowner of gopher tortoise habitat, and that agency's biologists are in the early stages of drafting habitat management guidelines for the DeSoto National Forest in Mississippi.

Region 5—The Region 5 staff is in the process of forming two teams to aid in the recovery of the Atlantic Coast population of the piping plover (*Charadrius melodus*) and the northern flying squirrel (*Glaucomys sabrinus*). A draft recovery plan for each species will be prepared sometime during the year.

Region 6—The last session of the Montana Legislature authorized funding to set up the Montana Natural Heritage Program. The program, affiliated with The Nature Conservancy and the Montana State Library, is staffed by a zoologist, botanist, plant ecologist, and data manager. The program will build and maintain a natural heritage data base to inventory and evaluate species diversity in Montana. Information used to build the data base will be collected from species experts, museum collections, and literature citations, and will be verified through field work. The data base, which should be ready for limited use this spring, will be available to all resource agencies in the State. The heritage program also will be extremely beneficial in providing information for the FWS Endangered Species Program in Montana.

Surveys for black-footed ferrets (*Mustela nigripes*) are being conducted in the vicinity of Meeteetse, Wyoming, and will continue through February. As of the end of December, eight black-footed ferrets were in captivity in Wyoming; six were healthy and two were suffering from canine distemper.

A special advisory group of outside experts has been established to provide

guidance to the Wyoming Game and Fish Department and FWS on a captive propagation effort for the ferrets. The group is being chaired by Dr. Ulysses Seal of the Captive Breeding Specialist Group, Survival Services Commission, part of the International Union for Conservation of Nature and Natural Resources (IUCN). Other members include Drs. James Doherty and Mike DonCarlos of the same organization. The group recently visited captive breeding facilities in Wyoming, and recommendations were made on the use of the facilities.

At a December 3, 1985, meeting of the Interagency Grizzly Bear Committee (IGBC), J.S. (Stan) Tixier, Regional Forester of the USFS Intermountain Region, was elected to a 2-year term as Chairman of the IGBC. Tixier succeeds Galen B. Buterbaugh, FWS Regional Director, in Denver, Colorado, who has served in that position since 1983. Dr. Dale Strickland, Assistant Chief of the Game Division, Wyoming Game and Fish Department, was elected Vice Chairman.

The IGBC was established in 1983 to coordinate recovery of the grizzly bear (*Ursus arctos horribilis*), which is listed as a Threatened species in the lower 48 States. It provides a mechanism for all Federal and State agencies with responsibilities for the grizzly to coordinate their management and research activities.

Region 7—Region 7's biologists from the Endangered Species and Ecological Services Divisions met with USFS biologists from two Alaska districts to discuss how USFS management plans might affect two vertebrate species that are candidates for listing, the Prince of Wales flying squirrel (*Glaucomys sabrinus griseifrons*) and the Montague vole (*Microtus oeconomus elymocetes*). Both are unique subspecies endemic to islands where the USFS is the principal land manager. Although neither appears to be in immediate need of protection, the USFS agreed to gather additional status information on these taxa during 1986.

The Aleutian Canada goose (*Branta canadensis leucopareia*) is the only subspecies of the large and successful *B. canadensis* group to once occur in both the North American and Asian continents. A breeding loan of 18 geese was made to two Japanese zoos in 1983, when the wild population that formerly wintered there dwindled to a single individual. We have just learned that Japanese biologists successfully raised several Aleutian geese this summer, and in October, six hatching-year birds were released into the wild at Lake Izunuma, Japan.

Region 8 (Research)—A new whooping crane breeding complex has been completed at the Patuxent Wildlife Research Center (PWRC). The facility consists of 24 large, chain-link pens, each with an automatic watering system, that will be used to house 12 pairs of cranes.

A total of seven Mississippi sandhill cranes (*Grus canadensis pulla*) were sent in late fall from PWRC to the Mississippi Sandhill Crane National Wildlife Refuge in Gautier, Mississippi, for release. This makes a total of 41 cranes that have been sent to the refuge since 1981. Nineteen cranes from previous releases still survive and comprise about 40 percent of the wild flock.

Surveys conducted in Mexico and the southwestern United States during the past three years by the Biological Survey Section of the Denver Wildlife Research Center have documented a reduced number of long-nosed bats at several historical roosting sites. Reasons for the declines remain obscure.

These nectar-feeding bats, *Leptonycteris sanborni* and *L. nivalis*, are migratory and fly northward each spring to maternity roosts in Texas and Arizona as agave flowers emerge. Big Bend National Park in Texas contains the only known roost of *L. nivalis*, and there are still approximately 1,000 animals there in summer. In years past, as many as 5,000 have been recorded in this well-protected roost.

In Arizona, where *L. sanborni* used to occupy many maternity roosts in numbers up to several hundred, there is only a single remaining historical roost housing the bats. Interestingly enough, the bats are frequent visitors to hummingbird feeders in several mountain ranges in southeastern Arizona, which suggests a new method for attracting them for census and study.

Both species winter in Mexico, where there are other populations that remain all year. A complete survey of the known *L. nivalis* roosts in eastern Mexico and those of *L. sanborni* in the west revealed many caves that no longer contain these bats. Long-nosed bats pollinate agave flowers of many species that grow over most of Mexico and the southwestern U.S. The disappearance of these bats might start a spiral of decline in the agaves and the many other species that depend on these plants.

The bat studies were accomplished through funding from the Region 2 Endangered Species Program and with the cooperation of the Dirección General de Flora y Fauna Silvestre of Mexico and the Instituto de Biología at the Universidad Nacional Autónoma de México.

Law Enforcement News

Two Federal court cases involving protected species were concluded recently when sentences were handed down by U.S. District Court Judge Dudley Bowen in Augusta, Georgia. In one case, a Bulloch County farmer was convicted of possessing a southern bald eagle (*Haliaeetus leucocephalus*) in violation of the Bald Eagle Protection Act. He was acquitted, however, of a charge that he killed the eagle. For possession, the man was sentenced to 6 months in prison and ordered to pay a \$2,500 fine. "I don't view this as a simple game violation," Judge Bowen was quoted as saying after the conviction. "I want to put people who mess with eagles behind bars."

The other case centered around the illegal possession and sale of hides from poached alligators (*Alligator mississippiensis*). It was alleged that the alligators were shot in coastal South Carolina, where the species is listed as Threatened. A man from Fife Plantation in Hardeeville, South Carolina, pled guilty to charges of possession and sale of the hides and was sentenced to 3 years in prison (all but 6 months suspended) and active probation for 5 years. He had sold the hides to a retired farmer from Metter, Georgia, who in turn sold them to Fish and Wildlife Service (FWS) undercover agents. Both men were found in violation of the Lacey Act, which prohibits possession, transport, and interstate sale of species taken in violation of other State or Federal conservation laws (in this instance, the Endangered Species Act). The Georgia man also was convicted of selling marijuana. He was sentenced by Judge Bowen to serve 2 years

in prison, followed by 5 years of active probation, and to pay restitution to the FWS for the money its undercover agents spent in purchasing the hides.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	14	141	3	2	0	220	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	10
Plants	86	5	1	23	2	2	119	43
TOTAL	258	49	458	72	11	37	885	220**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 185

Number of species currently proposed for listing: 26 animals
33 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

December 31, 1985

We Need Your Help

To make this *your* BULLETIN, as well as ours, we need your help. Please send the Editor any comments for improving the format, ideas for articles, photographs, and reports on current research and management activities.

New Publication

Freshwater Mussels of the Upper Mississippi River, a newly published pamphlet intended as an identification aid for common, rare, and endangered species of mussels, is available to interested

agencies and individuals. For copies, contact the Fish and Wildlife Service's Office of Endangered Species at the Federal Building, Fort Snelling, Twin Cities, Minnesota 55111.

January 1986

Vol. XI No. 1

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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Endangered Species Act Protection Sought for Three Aquatic Animals

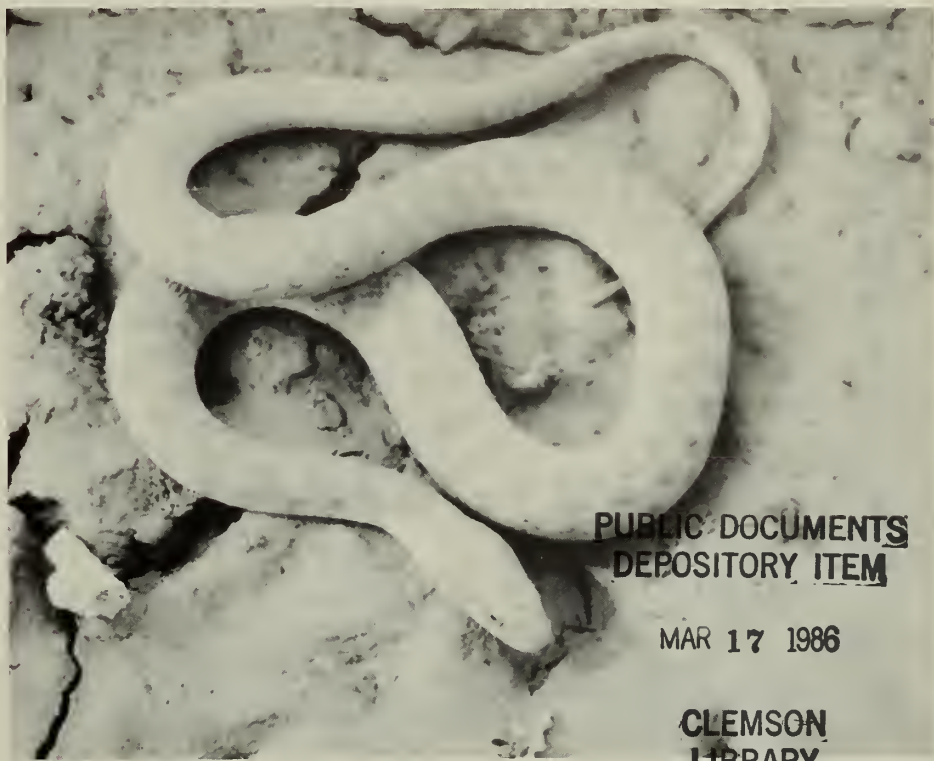
The Fish and Wildlife Service (FWS) has proposed adding three animal taxa—a snake, a turtle, and a crayfish—to the Federal List of Endangered and Threatened Wildlife, primarily because of threats to their limited aquatic habitat. If the proposals are later made final, Endangered Species Act protection will be extended to the following:

Concho Water Snake (*Nerodia harteri* *paucimaculata*)

The Concho water snake, a subspecies of the Harter's water snake (*Nerodia harteri*), is restricted to sections of the Concho and Colorado Rivers in west-central Texas. Historically, it occurred along 276 river miles, but it has disappeared from 78 miles of former habitat on the upstream end of the range and it now has only a spotty distribution within the rest. The snake's decline is mainly the result of impoundments altering its free-flowing stream and riparian habitat. Because of its low numbers, limited range, and vulnerability to further habitat loss from reservoir construction, the FWS has proposed listing the Concho water snake as Threatened (F.R. 1/22/86).

The only other subspecies of Harter's water snake, the Brazos water snake (*N. h. harteri*), is confined to the Brazos River drainage in Texas, but it is not as rare and is in no apparent danger. Unlike the Concho subspecies, *N. h. harteri* can live in impounded waters, under certain circumstances.

Adult Concho water snakes live in both shallow and deep stream areas, over a variety of substrates, as long as there is enough secure escape cover near their nursery grounds. The adult snakes often are found basking in woody vegetation along the river banks. Juveniles, however, have much more rigid habitat requirements, the two most important features of which are shallow, flowing water over a rocky substrate and the presence of flat rocks along the shore for hiding. Scattered stretches of the Concho and Colorado Rivers with these characteristics still support the snakes.



The Concho water snake is a nonvenomous subspecies that rarely exceeds 34.5 inches (90 centimeters) in length.

Concho water snake habitat has been degraded by four large mainstem reservoirs on the Concho and Colorado Rivers, plus several smaller impoundments on tributary streams. Damming streams affects the snake's habitat several ways: above dams, the rocky shoreline needed by the snakes is inundated; below dams, flows are curtailed and the streambed becomes dry or clogged with silt. The silt then supports growths of salt cedar and other vegetation, eliminating the riffle areas required by the juvenile snakes.

From 90 to 99 percent of the Concho water snakes located in recent surveys were concentrated in only 52 percent of the taxon's current range. Stacy Reservoir, a project proposed for the Colorado River, would inundate more than one-half of the primary habitat. An unknown amount of habitat downstream also would be affected, depending on the amount and timing of water releases from the reservoir.

Construction of Stacy Dam and Reservoir would require an authorization permit from the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899. If the proposal to list the Concho water snake as Threatened becomes final, the COE will be required under Section 7 of the Endangered Species Act to consult with the FWS on ways to avoid jeopardizing the survival of the snake or adversely modifying its Critical Habitat.

The area proposed as Critical Habitat includes a 45-mile stretch of the Concho River in Tom Green and Concho Counties, extending from a point 5 miles northwest of the town of Veribest downstream to the confluence with the Colorado River. On the Colorado itself, it includes approximately 86 miles in Runnels, Concho, Coleman, and McCulloch

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of January:

Region 1—The Sea Otter Project Leader, in cooperation with Dr. Marianne Reidman of the Monterey Bay Aquarium, completed a paper on south-

ern sea otters (*Enhydra lutris nereis*) at the request of the National Audubon Society for publication as a chapter in the 1986 *Audubon Wildlife Report*. The paper discusses species description, natural history, historical perspective and current trends, management, recovery goals, and recommendations.

U.S. Fish and Wildlife Service Washington, D.C. 20240

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Region 7, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542): Robert E. Gilmore, *Regional Director*; Jon Nelson, *Assistant Regional Director*; Dennis Money, *Endangered Species Specialist*.

Region 2—An injured whooping crane (*Grus americana*) from the Grays Lake, Idaho, flock was discovered in January near Los Lunas, New Mexico. The cause of injury is unknown, as the bird has not been captured and examined. The crane's lower breast and abdominal plumage were blood-covered for several days, and the bird sat during the daylight hours without feeding. It had difficulty walking and used its outstretched wings to maintain balance; however, it retained its flight ability throughout the recovery period. By the end of January, the crane was substantially improved, although still limping. It was feeding more normally and spending less time resting.

On January 16, two more whooping cranes were discovered on the Texas coast by personnel of Brazoria National Wildlife Refuge (NWR). They were located near the town of Brazoria about 95 miles from Aransas NWR. Both birds hatched in 1984. One is the juvenile that wintered with sandhill cranes (*Grus canadensis*) near El Campo, Texas, last winter, about 40 miles from Aransas. The other wintered on Aransas with its parents last winter. Counting these two whoopers, 96 birds returned to the Texas coast this winter.

Region 3—A meeting attended by 20 people associated with the recovery of the northern monkshood (*Aconitum noveboracense*) was held at the National Fishery Research Laboratory in LaCrosse, Wisconsin, on January 22 and 23. The meeting provided the attendees with information on current monkshood research projects, upcoming research, protection, and the plant's current status.

It was the consensus of the group that a recovery team should be formed and the current recovery plan updated. They decided that the recovery team will consist of a member from each State in which the monkshood exists (IA, NY, OH, WI) and two or three persons from the research community. A recovery plan update is scheduled to be completed by the beginning of the 1987 field season.

On January 23, a meeting of Wisconsin freshwater mussel experts, commercial clammers, and shell buyers also was held in LaCrosse. The purpose of the meeting was to gather information on species in need of protection and to discuss proposed State clamming regulations.

The Mingo NWR in Puxico, Missouri, hosted "Eagle Days" on January 18 and 19. Activities included films, talks about eagles, an appearance by a captive bald

(continued on page 5)

Two Plants Given Final Endangered Species Act Protection

In January, the following two plants were added to the U.S. List of Endangered and Threatened Plants:

Cochise Pincushion Cactus

The Cochise pincushion cactus (*Coryphantha robbinsorum*) is a small, unbranched cactus with pale yellow-green, bell-shaped flowers that appear in March and April. This cactus is known to occur in Cochise County, Arizona, on an active cattle ranch that is comprised of State and privately owned lands. A population has also been reported in adjacent Sonora, Mexico, but no further studies have been conducted there.

On March 6, 1985, the cactus was proposed for listing as a Threatened species due to destruction of its limited habitat from livestock grazing, soil disturbance, and erosion, and because of direct destruction of plants by trampling. (See BULLETIN Vol. X No 4.) While overgrazing is not now a serious problem, and the ranch owners are conservation oriented and sympathetic to the species' survival, a future change in ranch management could lead to rapid habitat deterioration.

Collecting also poses a serious threat to *C. robbinsorum*, not only because of its beauty and uniqueness, but because of its extremely concentrated location. More than half of the Cochise pincushion cactus' total population is located on less than 4 percent of its total range, making the species very vulnerable to commercial exploitation. In addition, this plant has a much lower reproductive potential than most other cacti, averaging an estimated annual production of 3 fruits with 20 seeds each per plant.

After carefully assessing all the information available concerning the threats facing *C. robbinsorum*, the FWS listed the species in a January 9, 1986, final

rule. Due to the plant's restricted distribution, accessibility, and attractiveness to cactus collectors, Critical Habitat was not designated for the Cochise pincushion cactus. Nevertheless, its habitat will still be protected under the provisions of Section 7 of the Endangered Species Act.

Lana'i Sandalwood or 'Iliahi

Known from two areas on the island of Lana'i in the Hawaiian Islands, the Lana'i sandalwood (*Santalum freycinetianum* var. *lanaiense*) is a small, gnarled tree that bears small clusters of bright red flowers. Only 39 individuals of this variety are known to exist. These remaining plants are divided into two populations, one near Kanepu'u and the other near the summit of the island. Both populations occur on private lands owned by Castle and Cooke, Inc., living in habitats ranging from dry lowland forests on well-drained, barren soils to mesic forests on shallow soils.

Extensive removal of Hawaiian sandalwoods, valued for their fragrance and beauty, for trade occurred from 1790 to 1820. This trade took place prior to the scientific community's discovery of the Lana'i sandalwood and could have previously reduced the number of trees. More recent population declines, however, are largely due to loss of habitat. Natural vegetation has been eliminated over vast areas of Lana'i, and native dryland forests have been severely degraded. Agricultural development, first for pasture and later for pineapple production, has removed large tracts of the native vegetation. Cattle, sheep, and axis deer, which were all introduced into the area, have removed and trampled vegetation, contributing to severe erosion of soils. Another serious threat to the taxon is predation of its fruits by

accidentally introduced rats, resulting in a virtual lack of reproduction.

Because of the Lana'i sandalwood's great vulnerability to extinction, the FWS proposed to list it as Endangered on March 6, 1985. (See story in BULLETIN Vol. X No 4.) The January 24, 1986, final rule now gives this Hawaiian rarity a better chance to survive.

A formal Critical Habitat designation was not part of the final listing rule. Although this species is no longer common enough for profitable commercial use, the Lana'i sandalwood could be threatened by individuals seeking the wood for its decorative and fragrance values. Publication of the required maps and descriptions that are part of a Critical Habitat designation would make the species even more vulnerable to collection. However, Section 7 provisions will apply for this plant.

Available Conservation Measures

Among the conservation measures that are now available to both the Cochise pincushion cactus and the Lana'i sandalwood are a requirement for the FWS to develop and implement plans for their recovery, possible Federal funding for State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. In addition, interstate and international trafficking in listed plants is prohibited, except under permit. For the Cochise pincushion cactus, which is listed as Threatened, properly documented seeds of cultivated specimens are exempt from this prohibition.

Ban on Condor Removal Extended

The National Audubon Society has won a Federal district court injunction barring the FWS from removing the last five California condors (*Gymnogyps californianus*) from the wild. This ruling extends the ban first imposed on January 9, 1986, through a temporary restraining order.

Six wild condors disappeared last winter, and another died January 18, 1986, several days after its capture, despite the efforts of veterinarians to treat

the bird for severe lead poisoning that it had incurred in the wild. The FWS had intended to bring the five remaining wild condors into captivity until the reasons for their continuing decline are discovered and resolved. They were to be used in the captive propagation program, through which the FWS hopes to produce young condors for release into the wild.

The FWS remains committed to the long-term goal of establishing a secure,

self-sustaining population of California condors in the wild. Temporary capture of wild condors, as needed for replacement of radio-tracking equipment and for tissue sampling, was not affected by the court decision.

Because the risks to the remaining wild condors have not changed, the Department of the Interior intends to appeal the injunction.

Three Aquatic Animals

(continued from page 1)

Counties, extending from a bridge near the town of Maverick downstream to the confluence of the Colorado River and Salt Creek. The proposed Critical Habitat designation also includes the banks of both rivers up to a height of 15 vertical feet above the water level at median discharge. These areas encompass 95 percent of the known surviving Concho water snakes; however, snakes and their habitat found outside the designated Critical Habitat also would receive protection.

The Harter's water snake, including both the Concho and Brazos subspecies, is listed as endangered by Texas, which controls collecting, possession, and sale. State law, however, does not protect the species' habitat. A Federal listing of the Concho water snake as Threatened would provide protection from harmful effects of Federal activities while reinforcing Texas law as it relates to the take and trade of this subspecies.

Comments on the proposal to list the Concho water snake as Threatened are welcome from all interested agencies, organizations, and individuals, and should be sent to the Regional Director, Region 2 (address on page 2 of the BULLETIN), by March 24, 1986.

Ringed Sawback Turtle (*Graptemys oculifera*)

Another reptile facing habitat loss from water management projects is the

ringed sawback turtle. This species is found only in the Pearl and Bogue Chitto Rivers of southern Mississippi and Louisiana. Some of its former habitat already has been modified by reservoir construction and flood control projects, while other areas have become marginal habitat, apparently due to water pollution impacting the turtle's molluscan food supply. Most of its remaining habitat is subject to modification from further flood control projects. In light of these factors, the FWS has proposed listing the ringed sawback turtle as a Threatened species (F.R. 1/22/86).

Ringed sawback turtle habitat is typically riverine with a moderate current and good water quality. The river must be wide enough to allow sun penetration for several hours, and it should contain numerous logs for basking and protection from predators. Large, high sand and gravel bars adjacent to the river are necessary for nesting. Although habitat apparently suitable for the ringed sawback turtle exists to the west of the species' known range, surveys have failed to produce any specimens from outside the main channels of the Pearl and Bogue Chitto Rivers. The ringed sawback turtle is already listed by Mississippi under State law as endangered.

Approximately 21 percent of the turtle's former range in the Pearl River already has been affected by an impoundment and several flood control projects, and others planned or authorized by the COE would have an impact on up to 28 percent of the remaining Pearl River habitat. Further, the Bogue Chitto River would be completely eliminated as suitable habitat for the ringed sawback turtle by an authorized channelization project on that system.

Ringed sawback turtles are unable to survive in large lakes or polluted water. Impoundments obviously eliminate turtle habitat by inundation. Flood control and navigation channel modifications can remove basking and nesting sites, change water flows, and increase turbidity to the detriment of snails and other mollusks eaten by the turtle. Drainage ditches and other watershed control structures can degrade water quality also by funneling silt and pesticides from agricultural fields into the rivers.

Because ringed sawback turtle numbers have declined, the impacts of wanton shooting (use of basking turtles for target practice) and collecting for the pet trade are becoming more serious. This very attractive turtle has been advertised for sale at \$65 each. Because of the threat from collectors, the FWS decided not to pinpoint the location of surviving populations by proposing a designation of Critical Habitat. Nevertheless, if the turtle is listed, Federal agencies whose activities may affect it will be required to consult with the FWS on ways to avoid jeopardizing the species while meeting project objectives. Federal actions expected to affect the species include COE flood control and navigation projects, certain activities needing COE permits, and Soil Conservation Service watershed projects.

Comments on the proposal to list the ringed sawback turtle as a Threatened species are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by March 24, 1986.

Nashville Crayfish (*Orconectes shoupi*)

Another animal imperiled by degradation of its aquatic habitat is the Nashville crayfish, which survives only within the Mill Creek basin in Davidson and Williamson Counties, Tennessee. Recent surveys failed to locate the species in three other watersheds, the Elk, Harpeth, and Cumberland River systems, where it historically had been collected. The species' remaining habitat in Mill Creek and five of its tributaries faces threats from stream alterations and a general deterioration of water quality.

In a 1981 report, the COE stated that "biological communities inhabiting Mill Creek during the 1981 survey indicated water of fair to very poor quality and the influence of moderate to extensive enrichment and disturbance." The lower part of the watershed lies within the highly urbanized Nashville metropolitan area, and water pollution is an increasing problem. Although the upper watershed has less residential and urban development, silt and pesticides

(continued on next page)



Prominent vertebral spines on the upper shell or carapace of the ringed sawback turtle are one of this species' distinctive characteristics.

FWS photo

Three Aquatic Animals

(continued from previous page)

from agricultural runoff also degrade the aquatic ecosystem.

The Nashville crayfish also faces potential threats from a flood protection project being planned by the COE. This project could involve the construction of two dry flood control dams that could, depending on project design, damage the habitat by altering stream flows, water temperature, and silt loads during the construction and operational phases.

Because crayfish of other species are frequently taken in the southeast for food and bait, the FWS decided not to increase the vulnerability of the Nashville crayfish by delineating its Critical Habitat. If it is listed, however, the species' habitat will receive protection from any adverse effects of Federal activities. For example, the COE would be



The Nashville crayfish can attain a length of over 6 inches (15 cm). Like most other crayfish species, it probably feeds on fragments of vegetation and animal matter.

required to consult with the FWS on its flood control program.

Comments on the proposal to list the Nashville crayfish as an Endangered species are welcome, and should be sent to the Field Supervisor, Asheville Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by March 25, 1986.

Available Conservation Measures

If the proposals to list these animals as Endangered or Threatened become final, all three species will receive protection under the Endangered Species Act. Among the conservation measures provided by the Act are: prohibitions on take, possession, and trafficking in these species without a Federal permit; protection from Federal activities that could jeopardize survival; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to State endangered species programs.

Regional Briefs

(continued from page 2)

eagle named Omega from the Dickerson Park Zoo in Springfield, and viewing our national symbol in the wild. Eagle Days were co-sponsored by the FWS and the Missouri Department of Conservation.

In the December 1985 BULLETIN (Vol. X No. 12), Region 3 reported that the Consolidated Grain and Barge Company of St. Louis, Missouri, had requested an exemption from the requirements of Section 7 of the Endangered Species Act for establishment of a barge floating area on the Ohio River. In January, Consolidated Grain and Barge formally withdrew its exemption application for the barge project.

A full authorities plant Cooperative Agreement as authorized under Section 6 of the Endangered Species Act has been signed between the State of Iowa and the FWS. Cooperative Agreements with Indiana, Ohio, and Missouri, also for the conservation of plants, are nearing completion.

Region 4—The Caribbean Field Office in Puerto Rico has received a petition from the Caribbean Islands National Wildlife Refuges to list the Puerto Rico and U.S. Virgin Islands population of the white-cheeked pintail (*Anas bahamensis*) as Threatened. Once considered to be Puerto Rico's most abundant and widespread waterfowl species, the pin-

tail has experienced an islandwide population decline since the 1950's due to hunting pressure and habitat destruction. By 1967-68, Flamenco Lagoon on Culebra Island was the only site where pintails could be found regularly and in significant numbers. The Commonwealth of Puerto Rico listed the species as endangered on its list of rare and endangered animals in 1973 and hunting of this bird was prohibited in 1976. Subsequent band recoveries indicate that illegal hunting continues despite this protection. Only 200 to 300 white-cheeked pintails, thought to be a distinct population unit, are estimated to remain in Puerto Rico.

In an article published in *Palmetto*, the newsletter of the Florida Native Plant Society, Dr. Daniel Austin of Florida Atlantic University reported that one of Florida's plant candidates for listing as Endangered or Threatened appears not to be a valid taxon. The climbing dayflower (*Commelina gigas*) was described by John Kunkel Small in 1933 from hammocks in the Lake Okeechobee region, where it was a vigorous, healthy plant that was frequently eaten by cattle. Dr. Austin searched for this dayflower for the FWS in 1980-81. Recently, he has been able to examine a large number of specimens of the variable tropical weed, *Commelina diffusa*, which has become widespread in the United States. The specimens that had been assigned to *C. gigas* turn out to be indistinguishable from robust *C. diffusa*. FWS will consider Dr. Austin's findings and may drop the plant from further listing consideration.

The Jackson, Mississippi, Endangered Species Field Station coordinated a survey of the interior population of the least tern (*Sterna antillarum*) in the lower Mississippi River Valley during June and July 1985. The survey covered the Mississippi River from the Missouri line downstream to Baton Rouge, Louisiana; the Arkansas River from the Oklahoma/Arkansas State line to its confluence with the Mississippi River; and the Red River across Louisiana to its confluence with the Mississippi.

Twenty-one colonies were confirmed or suspected on the Mississippi River from the Missouri/Arkansas State line downstream to Rosedale, Mississippi, a distance of 235 miles. Approximately 1,240 interior least terns were observed on this stretch of river. Farther south along the Mississippi, 60 interior least terns were observed but no colonies were located. Four interior least tern colonies containing 76 terns were observed along the Arkansas River. No terns were observed on the Red River.

The Jackson Endangered Species Field Station is conducting a status review on the Caddo Mountain salamander (*Plethodon caddoensis*), a vertebrate listing candidate that is known to occur only in the Caddo Mountain range of the Quachita Mountains in Polk and Montgomery Counties, Arkansas. Most of the occupied habitat is within Quachita National Forest.

Herpetologists have previously documented that this salamander survives hot, dry summers by burrowing under ground. Recent investigations by the

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Research Summary: Flattened Musk Turtle

by C. Kenneth Dodd, Jr.
DWRC-Gainesville, Florida

The flattened musk turtle (*Sternotherus depressus*), recently proposed as Threatened (see BULLETIN Vol. X No. 12), is confined to the Black Warrior River basin in northern Alabama. The turtle has declined from a combination of factors, principally from habitat degradation and commercial collecting. From April through September 1985, Denver Wildlife Research Center (DWRC) biologists studied the distribution and abundance of this species at 10 sites, 5 of which were affected by mining. In addition, data were gathered on movements, habitat use, morphology, basking behavior, growth, and the use of turtles by leeches.

Nearly 28,000 trap-hours yielded 490 individual turtles and 222 recaptures, 77

percent of the turtles were collected at one site. The sex ratio of 1.5:1 was skewed toward males. Very few turtles, nearly all old adults, were found in areas affected by mining. In addition, a substantial number of turtles at the only known large population was found to have pneumonia, which has generally proven fatal to the animals.

In addition to providing baseline data on the size and structure of turtle populations in different rivers, this study, using radio telemetry, showed that flattened musk turtles use a variety of cover sites and exhibit individual preferences in cover site selection. The turtles rarely moved over 30 meters, though they occasionally undertook long distance movements for short periods of time before returning to a favored cover site. DWRC scientists also were able to confirm that this turtle basks, and that a majority of basking turtles have pneu-

monia; however, the cause of the disease remains unknown.

Though mining certainly has affected populations of the flattened musk turtle, siltation from other sources continues to pose a substantial threat to the species. In addition, commercial collecting is still serious at some locations, and certain populations now reflect such collecting pressure in their size class distribution. Finally, the fragmentation of remaining populations by unfavorable habitat, thus restricting gene flow and making small populations subject to inbreeding and increased risk from a catastrophic event, could pose a long-term threat to the turtle's survival.

The data gathered last summer added substantially to the knowledge of the biological requirements of this species, and should prove valuable in planning for its conservation. The study was funded by the Office of Surface Mining, Department of the Interior.

Recovery Plan Update

The following recovery plans were recently approved: *Fat Pocketbook Pearly Mussel Recovery Plan* (10/4/85); *Salt Marsh Bird's-beak Recovery Plan* (12/6/85); and *Lotis Blue Butterfly Recovery Plan* (12/26/85). Summaries will appear in future issues of the BULLETIN.

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

Updated List Available

The Federal *List of Endangered and Threatened Wildlife and Plants*, updated to January 1, 1986, is now available. It incorporates all changes to the list since the last compilation (October 1, 1985), as published in 50 CFR 17.11 and 17.12. The 30-page document can be ordered from the Publications Unit, 148 Matomic, U.S. Fish and Wildlife Service, Washington, D.C. 20240.



flattened musk turtle habitat in the Black Warrior River basin

photo by C. Kenneth Dodd, Jr.

Withdrawal of Proposed Rule to List Trispot Darter

On January 3, 1986, the FWS withdrew a rule published in the July 13, 1984, *Federal Register* that had proposed listing the trispot darter (*Etheostoma trisella*) as an Endangered species with Critical Habitat. New data received by the FWS indicate that this fish is more widespread than thought at the time of the proposal and that it is not considered likely to become Endangered or Threatened in the foreseeable future.

The trispot darter was proposed for Endangered Species Act (ESA) protection concurrently with two other fish species, the amber darter (*Percina antessella*) and the Conasauga logperch (*P. jenkinsi*). (See story in BULLETIN Vol. IX No. 8.) On August 5, 1985, the amber darter and Conasauga logperch were listed as Endangered with Critical Habitat. In that final rule (see BULLETIN Vol. X No. 9), it was explained that a decision

on listing the trispot darter would be delayed due to substantial disagreement about the accuracy of available data relating to the listing determination.

When the trispot darter was proposed for listing, it was known from two populations, one in the Conasauga River and the other in Coahulla Creek, both located in areas encompassing parts of Georgia and Tennessee. Subsequently, the Georgia Department of Natural Resources located two additional populations and found the fish further downstream in the Conasauga River than was previously known. Based on this information, the FWS believed that the trispot darter might still qualify for Threatened status; however, it also believed that the new information created conflicting opinions about the species' status. The FWS then funded additional surveys to

assist in making the determination, and after their completion, found five existing trispot populations. In addition, trispot darter specimens were collected in creeks, which suggests that the species is not restricted to large rivers as previously believed. Many creeks not yet surveyed exist in the range of the species, and there is a possibility that they may also harbor populations of *E. trisella*. Furthermore, most of the habitat occupied by these populations is in stable, rural areas that are not experiencing rapid development.

After reviewing all the currently available biological information, the FWS is convinced that the trispot darter does not warrant protection under the ESA. However, if new information becomes available that indicates otherwise, the species could again be proposed for listing.

Regional Briefs

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U.S. Forest Service (USFS) of abandoned mines in the Quachita Mountains discovered large aggregations of Caddo Mountain salamanders in two mines during the summer months. The largest reported aggregation of this species, over 100 individuals, was documented from one of the mines. Future investigations could reveal that these mines also provide breeding habitat. Protective measures for the mine habitat are being investigated by the FWS and USFS.

Region 5—A Section 7 nationwide consultation under the Endangered Species Act was conducted for the Environmental Protection Agency (EPA) on the use of the pesticide Diazinon on golf courses and sod farms. The Endangered Hawaiian goose (*Nesochen sandvicensis*) and Mohave tui chub (*Gila bicolor mohavensis*) were found to be adversely affected by this pesticide. A report was submitted to EPA.

Regional Director Howard Larsen appointed a recovery team for the Atlantic population of the recently listed piping plover (*Charadrius melodus*). Dick Dyer of the Region 5 staff will serve as team leader. Mr. Larsen also appointed a recovery team for the northern flying squirrel (*Glaucomys sabrinus*) with Ken

Knight, West Virginia Wildlife Resources Division, as team leader.

Region 6—In spring 1984 and fall 1985, an informal working group gathered in Jackson, Wyoming, to discuss the status and characteristics of the Gray's Lake whooping crane population, to encourage interstate cooperation in managing and monitoring cranes, and to discuss strategies for Section 7 consultation involving cranes. The post-migration spring dispersal of cross-fostered cranes from the Gray's Lake experiment into other habitats in Idaho, Wyoming, Colorado, Utah, and Montana illustrates the need for consultations that would enhance the establishment of a viable population of whooping cranes in the Rocky Mountain region.

The fall 1985 meeting focused on impacts of energy-related developments on cranes, status of the population, implementation of the whooping crane contingency plan, rapid reporting of crane sightings to Gray's Lake experiment project leader Rod Drewien, and responsibilities of recovery coordinator Jim Lewis (Region 2). The group also discussed the idea of involving a wide spectrum of agencies and private interests from the five States surrounding the Gray's Lake experiment in the work group next year.

Members of this year's group plan to draft a Whooping Crane Information and Section 7 Assessment Handbook for review by those invited to the next meeting in Jackson. Federal and State

biologists and other natural resources professionals will need to address the effects of a variety of development projects and other land management operations on the survival and recovery of whooping cranes, while the FWS awaits the first successful pairing and breeding of the whoopers produced via the Gray's Lake experiment.

The two black-footed ferrets (*Mustela nigripes*) that were reported last month as being sick have died of canine distemper, one at the end of December and the other in early January. The remaining six ferrets in captivity, two males and four females, are healthy. The animals are being immunized with a killed distemper vaccine, and blood sampling indicates that immunity has been established. An attempt will be made to breed the ferrets in February and March 1986; however, since both males are immature, the probability of success is considered poor. Ferret surveys will continue as weather permits through February and March.

The FWS and the Commissioners of the Wyoming Game and Fish Department have approved funding for a captive breeding facility to be located 45 miles northeast of Laramie, Wyoming. Construction is expected to begin this spring.

The Survival Services Commission from the International Union for Conservation on Nature and Natural Resources (IUCN) captive breeding advisory group

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Regional Briefs

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met January 17-19, 1986, in Laramie, Wyoming. It was agreed that Mike Don-Carlos, Minnesota Zoological Gardens, will work with the captive breeding program for one month, and Reinhardt Wuestenberg will be available for one week. The group will continue to advise and assist the Wyoming Game and Fish Department with efforts to recover the black-footed ferret.

Region 8 (Research)—Patuxent Wildlife Research Center (PWRC) investigators have spotted four Kirtland's warblers (*Dendroica kirtlandii*) in the Bahama Islands since the beginning of the field season in early December. On Eleuthera Island, a female and banded male were observed together where the male was banded last winter. Feeding and habitat use data have been collected. On Turk's Island, a male and female also have been observed where Kirtland's warblers were seen last year. The study evaluates the winter range and limiting factors of the Kirtland's warbler on its wintering grounds.

Eight Florida sandhill cranes (*Grus canadensis pratensis*) from the PWRC were shipped to the Mississippi Sandhill Crane NWR in Gautier, Mississippi, on January 2. During the upcoming breeding season, these birds will serve as fos-

ter parents for Mississippi sandhill crane (*G. c. pulla*) eggs and chicks that have been abandoned by parents or are in danger of being lost to predators. In the

past, such eggs and chicks were shipped to the PWRC for incubation and/or foster care.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	14	141	3	2	0	220	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	20
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	11
Plants	87	5	1	23	3	2	121	44
TOTAL	259	49	458	72	12	37	887	223**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 188

Number of species currently proposed for listing: 29 animals
31 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 45 fish & wildlife
23 plants

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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Endangered Species Program, Washington, D.C. 20240

Final Endangered Listings Approved for Two Species

During February 1986, two rare taxa—a subspecies of falcon and a freshwater wetland plant—were added to the Federal List of Endangered and Threatened Wildlife and Plants. Endangered Species Act protection is now available for the following:

Northern Aplomado Falcon (*Falco femoralis septentrionalis*)

An apparently non-migratory bird of prey, the northern aplomado falcon once could be found in southeastern Arizona, southern New Mexico, southern Texas, much of Mexico, and the western coast of Guatemala. It is now extirpated as a breeding species in the United States, primarily as a result of habitat modification, and it is currently known to nest only in parts of eastern Mexico. The survival of this subspecies is jeopardized by continuing habitat modification and by environmental contamination from pesticides. These threats prompted the FWS to propose on May 20, 1985, to list the northern aplomado falcon as Endangered. (See story in BULLETIN Vol. X No. 6.) On February 25, 1986, the final listing rule was published.

Typical northern aplomado falcon habitat is open rangeland and tropical savanna, characteristics that expose prey species and provide nesting sites for the bird. Widespread encroachment of this habitat by brushy plants, such as creosote and mesquite, eliminated the northern aplomado falcon from the U.S. and continues to be a limiting factor for the bird throughout its remaining range. The main threat today, however, is the use of persistent organochlorine pesticides like DDT, which enter the falcon's food chain and result in eggshell thinning and reproductive failure. Although DDT application is prohibited in the U.S., the chemical is still used within parts of the falcon's range south of the U.S.

Canby's Dropwort (*Oxypolis canbyi*)

This perennial plant, a member of the parsley family (*Apiaceae*), grows up to
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photo by Steve Dobrott

The northern aplomado falcon is one of our most colorful birds of prey. "Aplomado" is Spanish for gray or lead colored. Adults are characterized by a gray dorsum, rufous underparts, a long and banded tail, and a distinctive black and white facial pattern.



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of February:

Region 1—In a conference report under Section 7 of the Endangered Species Act, the Laguna Niguel, California, Field Office identified impacts to a population of the least Bell's vireo (*Vireo bellii pusillus*). The conference involved

the proposed flood control project on the San Luis Rey River in the city of Oceanside, San Diego County, California. It would have likely extirpated the San Luis Rey River population of the least Bell's vireo, and would have also resulted in destruction and adverse modification of proposed Critical Habitat for the species.

U.S. Fish and Wildlife Service Washington, D.C. 20240

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska

The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

The FWS has released a draft management plan for the least Bell's vireo that was developed by the Sacramento, California, Endangered Species Office (SESO) in cooperation with the Division of Ecological Services at Laguna Niguel. Approximately 70 interested parties, including Federal agencies, local governments, developers, and conservation organizations, have been asked to provide comments on the plan. The objectives of the plan are to protect, secure, and manage at least 20,000 acres (8,065 ha) of least Bell's vireo habitat distributed in 12 existing management areas, and in other historical breeding locations in southern and northern California. The goal is to provide for the maintenance of a minimum of 5,000 breeding pairs.

Recent water quality problems significantly reduced the Endangered Mohave tui chub (*Gila bicolor mohavensis*) population at Soda Springs in San Bernardino County, California. The Bureau of Land Management's (BLM) dredging of Lake Tuendae in December 1985 may have contributed to the problems. This decrease has serious implications for the fish's recovery program.

The Olympia, Washington, Field Office participated in the wintering bald eagle (*Haliaeetus leucocephalus*) communal night roost survey on the Skagit River. Two suspected roost sites have been verified and are being monitored. Surveys will continue into March.

The Boise, Idaho, Field Office completed a Memorandum of Agreement with the Idaho Natural Heritage Program for data exchange. The FWS may now access the Heritage Program data base and obtain documents for Federal projects.

The recovery coordinator at the Honolulu, Hawaii, Field Office presented a paper at the Western Section of the Wildlife Society's annual meeting in Reno, Nevada, on the effects of feral ungulates on forest birds in Hawaiian rain forests. It included management recommendations for maintaining and enhancing forest bird habitats, and for developing strategies to control feral ungulates.

The regional office completed a biological opinion for BLM's Umpqua River Corridor Habitat Management Plan (HMP). The HMP proposes to set aside approximately 3,200 acres of BLM administered lands along this Oregon river to implement habitat improvement measures, reduce human disturbance, and conduct a monitoring program.

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Endangered Plants of Our Caribbean Islands: A Unique Flora Faces Unique Problems

by
David Densmore
FWS Caribbean Field Office
Boqueron, Puerto Rico

During the nearly 500 years since the arrival of Christopher Columbus, Puerto Rico and the Virgin Islands have undergone enormous and, in many cases, irreversible changes. As with island systems elsewhere in the world, this group has proved vulnerable to the alterations and introductions that accompanied settlement by Europeans. The islands' flora has been significantly affected and, until recently, was unprotected by Federal law.

Puerto Rico, although geographically a part of the Greater Antilles, is geologically connected to the Virgin Islands (both U.S. and British). Together they form the Puerto Rican Bank, a group of volcanic islands, islets, and rocks projecting from a submerged shelf surrounded by deep Atlantic and Caribbean waters. The islands are also floristically related; nearly all of the plant species present on the Virgin Islands also occur in Puerto Rico.

Puerto Rico, having the greatest geographic, topographic, and climatic variation of the U.S. Caribbean islands, displays the highest plant diversity and endemism (i.e., restriction to one locality). More than 3,000 plant species, of which 234 (8 percent) are endemic, occur within its 3,500 square miles. Among approximately 550 tree species, the rate of endemism is considerably higher (26 percent). Although the insular tropical and subtropical flora can be characterized as West Indian, its origins are largely South and Central American. Most of the remaining species native to Puerto Rico and the Virgin Islands are widely distributed in continental tropical America.

Although some deforestation took place in pre-Columbian times, the natural vegetation of Puerto Rico and the Virgin Islands has been most drastically altered since the arrival of European colonists. By 1912, more than 80 percent of the islands' area had been deforested, and less than 1 percent (approximately 22,000 acres) of their total area remained in pristine condition, nearly all of it in Puerto Rico's Luquillo Mountains. Initially, coastal and lowland forests were cleared for agriculture (principally sugarcane and tobacco), grazing, and timber. The introduction of goats and cattle had a particularly deleterious effect on the vegetation, especially in

the drier areas. The impact of human development was severe in the lowland river valleys, where floodplain forests and wetlands were all but eliminated. However, due to topographic extremes, clearing of upland forests was more selective; thus, the extinction of many endemic plant species was avoided.

The twentieth century has brought increased economic growth and a concomitant increase in population density, most notably on Puerto Rico. By 1981, the population of this single island had risen to 3.2 million—nearly 1,000 individuals per square mile. The shift from an agrarian to an industrial economy resulted in emigration from rural to urban areas, with abandonment and natural reforestation of agricultural lands. This shift, however, together with the increased pressure of a steadily growing population, is placing a higher premium on land use for housing, highways, communications facilities, and solid waste disposal, thus renewing demands on lands now undergoing vegetative recovery.

In many ways, current land use practices are exerting a more profound influence on the flora than those of the past. In the Virgin Islands, the effects of agriculture and grazing are being replaced by the impacts of resort and residential development. Although there has been an increased awareness of the need to conserve forest cover, at present only 4 percent (88,000 acres) of the land area of Puerto Rico is protected by National or

Commonwealth Forest status. Many of the plant species that are recognized as requiring protection occur largely or exclusively on private lands.

During the past 15 years, implementation of the Endangered Species Act and resulting investigations into the status of rare plant species have revealed the degree to which the native flora of Puerto Rico and the Virgin Islands is threatened. More than half of the 234 endemic species may be in trouble, and some are on the verge of extinction. Between 1980 and 1983, 109 species received Federal recognition when they were placed on the list of candidates under review for formal listing; however, it was not until April 1985 that the first plant species from the region was placed on the U.S. List of Endangered and Threatened Wildlife and Plants.

Listed as Endangered, the beautiful goetzea (*Goetzea elegans*) is a small evergreen tree in the nightshade family (Solanaceae) that was once believed extinct. The species was rediscovered in the moist coastal forests of northern Puerto Rico, and is now known to number 50 individuals, all on private lands. In August 1985, Vahl's boxwood (*Buxus vahliae*), a member of the boxwood family (Buxaceae), became the second Puerto Rico plant officially listed as Endangered. Fewer than 60 individuals of *B. vahliae* remain. They grow on private lands in forest types similar to those inhabited by *Goetzea elegans*.

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Montane forests of the Luquillo Mountains (within the Caribbean National Forest) are refugia for many threatened and endangered plants.

photo by Bernice DeSantos

Caribbean Plants

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A third tree, the prickly ash (*Zanthoxylum thomasianum*), was listed as Endangered on December 20, 1985. The species is nearly extinct in Puerto Rico, but approximately 300 plants were known to exist at one site on St. Thomas, U.S. Virgin Islands. However, during the final days before the species was listed, half of the remaining St. Thomas plants were destroyed during clearing for construction of vacation homes. The Caribbean Field Office was informed of the problem by concerned citizens, and it is now negotiating to protect or salvage the remaining plants.

In addition to the above species, other listing proposals have been prepared. One of these is for *Banara vanderbiltii*, another small evergreen tree of the moist coastal forests of northern Puerto Rico, where a single population of six individuals grows on private land. Close to San Juan and surrounded by urbanization, this population may be extirpated at any time. Another 94 species are candidates for listing, and many number fewer than 100 plants. More than 20 additional species are now known to be equally as rare and will be added to the next revised notice of plant candidates for listing. Most of these are endemic to Puerto Rico, and many occur only in the moist lowland forests

of the north coast, an area experiencing the greatest industrial and residential growth.

There is considerable catching up to do. The FWS is being alerted to the plight of individual plant species faster than those already under consideration can be formally surveyed and listed. Not only is there a backlog of candidate species needing protection, but there is also a need to establish an overall strategy for their recovery.

The FWS Caribbean Field Office is coordinating with the Center for Plant Conservation (a nationwide organization recently formed to coordinate the collection and cultivation of endangered plants) and regional botanical gardens for the collection and transfer of plant material from surviving populations of species considered to be in jeopardy. This material will then be maintained as insurance against loss and to provide material for research, education, and reintroduction.

What is the outlook for the future? Can Puerto Rico, with its extremely high population density and overwhelming social needs, respond effectively to the conservation needs of plants and their habitats? From the perspective of the FWS and other resource agencies, this region represents the only area of the New World tropics where strong legislation enacted to protect species and their habitats is available. The lessons learned through this process may prove valuable in other tropical regions where the same questions must be answered.

Approved Recovery Plans

The following species are among those for whom recovery plans have been approved in recent months. Copies of recovery plans are available for purchase approximately 6 months after the date of their approval from the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone toll-free at 800/582-3421.

* * *

Santa Barbara Island Liveforever

The Santa Barbara Island liveforever (*Dudleya traskiae*) is a small perennial herb in the stonecrop family (Crassulaceae). Its succulent leaves, which grow 1.5 to 6.0 inches (4 to 15 centimeters) in length, form basal rosettes. A typical plant has 8 to 12 rosettes, each consisting of 25 to 30 leaves. Inflorescences 8 to 12 inches (20 to 30 cm) high arise from the rosettes and the yellow flowers, which are frequently tinged with red, generally open in April and May.

D. traskiae was listed as Endangered in 1978. This species is endemic to Santa Barbara Island, one of the smallest of the Channel Islands located off southern California. The island, managed by the National Park Service (NPS) as part of Channel Islands National Park, is only 652 acres (264 hectares) in size and is bounded by rugged cliffs. The liveforever grows in shallow, rocky soils within several canyons on the eastern side of the island, on the southern cliffs, and on the steep slopes of Signal Hill at the southwestern edge of the island. During 1982-1984 surveys by NPS personnel, only 10 colonies of *D. traskiae* could be found. Historically, the species probably occupied much more of the island than it does today.

The 1984 NPS survey located only 229 mature individual plants, and the number observed to flower decreased from 95 in 1983 to 58 in 1984. Most of the plants were found on Signal Hill.

Direct and indirect impacts of human activity on the small island have damaged the natural vegetation, including *D. traskiae*. By 1849, Santa Barbara Island was densely populated with feral goats (*Capra hircus*) that settlers had earlier introduced. Trampling and intensive grazing by these animals may have seriously reduced liveforever numbers and distribution before the goats were eliminated from Santa Barbara Island around 1915. Another exotic herbivore, the "New Zealand Red" strain of the

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Condominiums, hotels, and vacation homes compete for limited space in the U.S. Virgin Islands to the exclusion of natural vegetation.

photo by Robert Pace

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domestic rabbit (*Oryctolagus cuniculus*), was introduced on the island in 1942, and its numbers increased to an estimated peak of 2,621 animals in 1955. Biologists from the Santa Barbara Museum of Natural History have observed both rabbits and the island's endemic deer mice (*Peromyscus maniculatus elusus*) feeding on the liveforever. An NPS control program, which began in 1954, resulted in the elimination of rabbits from Santa Barbara Island by August 1981.

Although eradicating exotic goats and rabbits was essential to the recovery of *D. traskiae*, it did not in itself recover the species. There have been problems in recent years with poor seedling establishment, due to climatic or unknown factors. The 1984 NPS survey of Santa Barbara Island tallied only 673 liveforevers, including seedlings.

Exotic vegetation, particularly aggressive weedy species, has greatly influenced the vegetation of Santa Barbara Island, and may have contributed to the decline of *D. traskiae*. One of the best known of the invading species is the iceplant (*Gesoul (=Mesembryanthemum) crystallinum*), which was said to have covered more than half of the island before being burned back by a large fire in 1959. (The same fire probably caused the extinction of the endemic Santa Barbara Island song sparrow, *Melospiza melodia graminea*.) Currently, iceplant is again scattered over much of the island and this weed covers the summit of Signal Peak.

The NPS has already taken a number of steps to conserve habitat on Santa Barbara Island. In addition to eliminating the rabbits, it has removed all vehicles from the island, kept visitors away from sensitive areas, and developed plans for the management of natural and cultural resources within the Channel Islands National Park. The NPS also has proposed a long-term research program that would map and monitor each liveforever site.

Recovery Actions

The *Santa Barbara Island Liveforever Recovery Plan* was approved June 27, 1985. Its ultimate objective is to ensure recovery by securing all colonies in a vigorous, self-sustaining condition and reestablishing the species in 95 percent of its apparently suitable habitat. As an interim step, consideration could be given to reclassifying *D. traskiae* from Endangered to Threatened when all known colonies are protected and self-sustaining, and when the species occupies 50 percent of the suitable habitat. Criteria for identifying "suitable habitat" will be determined following further research.

Under the Endangered Species Act, the Santa Barbara Island liveforever and its habitat receive protection from take, trade, and adverse effects of Federal activities. Further, the NPS *Natural and Cultural Resources Management Program and General Plan* states that there will be no further development of the

island. The NPS will continue to protect sensitive areas of the island from visitor use.

A program of reintroducing *D. traskiae* into historical habitat is recommended in the recovery plan as a means of establishing viable population levels and/or new colonies. Seeds would be gathered from selected wild plants on the island during late summer and cultivated by horticulturists knowledgeable of *Dudleya* and other members of the stonecrop family. Care should be taken to collect the fewest seeds necessary from any given area and only what seed is needed for the annual production of 100 to 500 seedlings. Before any reintroduction can occur, however, more research must be conducted on the species' ecology and reproductive biology.

The NPS has proposed a 3-year feasibility project to eradicate the non-native iceplant and annual grasses. Although it will not directly affect the liveforever, a successful project could eventually permit reestablishment of the species on "reclaimed" areas. Action also will be taken against exotic herbivores like murid rodents and garden snails, if it is believed necessary for *D. traskiae* survival.

The recovery plan recommends a long-term monitoring effort to detect demographic trends and to warn of potential threats to the species or its habitat. If this and other recovery actions specified in the plan are successful, the Santa Barbara Island live-



Santa Barbara Island liveforever inflorescence

photo by Reid Moran

Approved Plans

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forever indeed may gain a chance to live forever.

MacFarlane's Four-o'clock

The MacFarlane's four-o'clock (*Mirabilis macfarlanei*) was named for Ed MacFarlane, a boatsman who discovered the plant along the Snake River in Oregon in 1936. This member of the Nyctaginaceae or four-o'clock family is a perennial with a stout, deep-seated taproot, somewhat succulent leaves, and large (up to 25 mm long and 25 mm wide), rose-purple flowers. Species belonging to this family are named after one of the commonly cultivated members whose flowers open up in the afternoon.

Two populations colonies of *M. macfarlanei*, comprising seven colonies, currently exist. They are spread over approximately 60 acres in northeast Oregon and west-central Idaho on both public and private lands. The plants are scattered on open, steep slopes of sandy soils.

Mirabilis taxa in the U.S. are mainly restricted to the Southwest, so it is quite unusual for *M. macfarlanei* to exist as far north as Idaho and Oregon. It is assumed that the genus expanded northward during a period of warmer climate; when temperatures cooled, the species was, in essence, trapped. The Salmon and Snake River canyonland area in northeastern Oregon and west-central Idaho provides some of the longest growing seasons and mildest winter conditions of any mountainous region east of the Cascades. If *M. macfarlanei*

originated in the north during a warmer period and its path of retreat was cut off by cooling climate and less favorable conditions, the warmer canyon climate would explain the species' restricted distribution.

On October 26, 1979, the FWS listed MacFarlane's four-o'clock as Endangered because of the many threats to its survival. The Oregon population along the Snake River shares its canyon bottom habitat with a hiking trail, and use of this river trail has increased since the area was designated a National Recreation Area. Trampling as well as plant collection at the site poses problems for *M. macfarlanei*. Collecting of these rather attractive plants could easily cause extirpation if the population sites become widely known.

At the time the species was listed, the effects of grazing on its survival were not known, but recent evidence suggests that grazing may have an effect on the recovery of *M. macfarlanei*. The mere presence of livestock trampling, which causes soil erosion, appears to be a potential hazard. In addition, at least two species of fungi have been observed on the vegetative parts of some plants located above the Snake River. However, the overall effects of fungal diseases on this species are not yet known.

Recovery Actions

The prime objective of the MacFarlane's Four-o'clock Recovery Plan (approved by the FWS on March 27, 1985) is to protect and manage a total of 10 *M. macfarlanei* colonies, at least five in each population. The first step in this recovery effort is to identify a sufficient number of colonies that includes a wide spectrum of the species' current genetic variability. Potential habitats should also be identified and surveys con-

ducted to determine if any additional colonies exist.

Once the colonies have been identified, at least 10 sites must be secured by long-term administrative agreements with the landowners on whose land *M. macfarlanei* is found. Landowners of all sites will be apprised of the nature of the FWS recovery effort for this plant, and their willingness to participate in agreements for the species' protection will be determined. General habitat management and rehabilitation needs will also be discussed with the landowners.

After the colonies and habitats have been located and secured, proper management of the *M. macfarlanei* colonies must follow if recovery objectives are to be achieved. Habitat Management Plans developed and implemented for each colony will aid in this important endeavor. Further study of the species to determine colony status and trends, including distribution of the species, response to environmental demands, adaptation, and speciation, will also aid significantly in learning about the optimal habitat conditions for its survival and, ultimately, aid in its recovery. Other studies to determine the effectiveness of management activities and to determine factors such as competition with associated species, abiotic requirements, and impacts of various threats to the plant will prove beneficial in developing more accurate management techniques.

If, by chance, enough colonies in each population are not located and secured, it will be necessary to establish sufficient colonies in similar habitats within the species' historical range to satisfy the recovery objectives. It is estimated that no more than three colonies would be required, in addition to the seven extant colonies identified for protection in the objective. Selected sites must possess as nearly as possible the same habitat characteristics as the extant colonies and preferably be located on public lands.

Another significant step in the recovery of *M. macfarlanei* is to develop criteria for production of quality propagated plants. The first part of this recovery task is to reduce the loss of colonies and genetic variability resulting from habitat loss and alteration, illegal take, or other stresses as they become evident. Next is selecting a grower that has the knowledge, capability, and proven record required to produce seedlings. The grower could establish a reservoir of propagules for each existing colony to be used in new colony reestablishment in the event of local extirpations. Most importantly, propagating and transplanting *M. macfarlanei* should be done in a manner that will maintain the genetic integrity of existing populations.

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MacFarlane's four-o'clock (*Mirabilis macfarlanei*) habitat along the Snake River, Oregon.

Approved Plans

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Salt Marsh Bird's-Beak

The salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*) is listed by the FWS and the state of California as Endangered. This plant is limited to remnants of coastal saltwater marshes scattered from northern Baja California, Mexico, to Santa Barbara County, California. It has declined from a wider historical distribution, and the limited remaining habitat is vulnerable to development and modification.

The bird's-beak is an unusual component of its salt marsh ecosystem in that it is an annual and hemiparasitic, deriving water and perhaps nutrients from root connections with other plants. The appearance of individual plants can vary considerably. The leaves and stems typically exhibit an abundance of purple pigment, although some individuals are predominantly light-green. Flowering also is variable. The salt marsh bird's-beak can bloom from April to December. In its northern range, the flowers have conspicuous purple lower lips, while to the south they have pale cream-colored flowers with faint purple lines. However, flower color often varies within a single marsh.

All known colonies are located in or near salt marshes, primarily in the upper marsh elevations that are inundated by the highest tides on a periodic basis but above lower areas that receive daily salt water flooding. Marshes, particularly the upper, drier areas that are easier to drain and fill, are vulnerable to damage or destruction from many human activities, including (but not limited to): dumping of dredge spoil, rip-rap, and garbage; draining for agricultural or industrial uses; burning; off-road vehicle (ORV) use; creation of levees, berms, and roads; intentional flooding for various purposes; and dredging for marina developments.

Salt marsh habitat was never extensive in southern California, and all of the sizable marshes between Morro Bay, California, and Ensenada, Mexico (about 75 miles south of the border), have been modified. Ten of them have been drastically altered and three others were completely destroyed. The remaining marshes have been modified to varying degrees, and support only remnants of the former vegetation.

Since 1975, *C. m.* ssp. *maritimus* has been verified as extant in six of the estuaries from which it previously had been reported, in addition to a new site at Ormond Beach near Point Mugu. (A map is available in the recovery plan.) Its survival at other historical localities is thought unlikely in light of the heavy habitat modification, although further

surveys are recommended. Two Endangered birds can be found in the marshes where the bird's-beak still grows, the California least tern (*Sterna antillarum browni*) and the light-footed clapper rail (*Rallus longirostris levipes*).

Recovery Actions

The *Salt Marsh Bird's-Beak Recovery Plan*, approved December 6, 1985, outlines the steps thought necessary to restore *C. m.* ssp. *maritimus* to a secure, self-sustaining status. Reclassification from Endangered to Threatened can be considered when the plant has been maintained in sufficient numbers (yet to be determined) at 12 or more major sites within its historical range. More information will be needed before the standards for recognizing full recovery can be established.

The plan recognizes that recovery can only be achieved by maintaining and restoring coastal salt water marsh ecosystems upon which the plant depends. Protection of existing bird's-beak colonies and potential habitat in the Tijuana River estuary of southern California is a high priority. Federal holdings in the area include the Tijuana Slough National Wildlife Refuge, and management of this refuge could be used as a model for marsh habitat management at other sites for the benefit of the bird's-beak and other Endangered species.

The recovery plan recommends controls on visitor use and ORVs in sensitive marsh areas, along with on-site personnel to enforce such measures. Certain habitat management activities may be needed in order to maintain the critical balance of salt water and fresh water entering the ecosystem, to prevent excessive or unusual flooding resulting from high upland runoff, and to prevent other potentially harmful changes in marsh hydrology.

U.S. Navy property at Point Mugu and the Tijuana River estuary historically supported large, vigorous colonies of the bird's-beak. There is a possibility also that other military lands, such as the Santa Margarita River estuary on Camp Pendleton, may still contain colonies or at least suitable habitat for recovery. Increased cooperation between the Navy and the FWS in management of these areas through Memoranda of Understanding is called for in the recovery plan.

Because the bird's-beak and potential habitat also exist on some State, municipal, and private lands, the plan calls for seeking cooperative management agreements for these sites as well. Two colonies still exist in upper Baja California, Mexico, and the FWS will offer assistance to Mexican conservation officials.

The feasibility of maintaining an emergency supply of seed from each site should be investigated. It may later be possible to create a secondary source of seeds by cultivating plants from wild-collected seeds. If a colony later were to suffer catastrophic seed loss, the site could be reseeded the next growing season. The FWS is investigating the possible use of seeds to reestablish extirpated colonies where suitable habitat remains.

The recovery plan recommends additional studies on the biology of *C. m.* *maritimus* and on coastal salt marsh ecosystems. Information gathered during such research is needed in order to better manage the habitat, to select potential reintroduction sites, and to determine population level goals for recovery. Field studies are continuing in an effort to detect any new colonies or to rediscover stands thought to be extirpated. Finally, periodic monitoring will be needed to evaluate the plant's status and to gauge the success of the recovery effort.

Regional Briefs

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The Office of Sea Otter Coordination prepared and distributed a revised preliminary draft Environmental Impact Statement and translocation plan for the proposed translocation of southern sea otters (*Enhydra lutris nereis*).

Efforts by the SESO reached fruition for mitigating the loss of habitat for the Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), which feeds on elderberry plants. The loss occurred during removal of riparian vegetation for the American River Flood Control Project. The California Department of Water Resources has agreed to begin a program of elder-

berry replanting to mitigate the loss of 29 elderberry bushes that were accidentally damaged or destroyed during maintenance work for the flood control project. An agreement to prevent future disturbance of the beetle's habitat during work on the project will be prepared.

Responding to efforts by the SESO, Laguna Niguel Field Office, and California Department of Fish and Game (CDFG), the Bureau of Reclamation (BR) recently concluded negotiations for the purchase of three key sections of privately held land in San Sebastian Marsh, Imperial County, California. The acquired lands include over three linear miles of proposed Critical Habitat for the desert pupfish (*Cyprinodon macularius*) along the San Felipe Creek. The lands

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were acquired to satisfy BR's mitigation obligations relative to a project it completed in another part of the Imperial Valley in the early 1980's. The area will be turned over to CDFG after a habitat management plan has been prepared.

The SESO reported that progress has been made regarding the use of Famphur R, an insecticide that is poured onto the backs of cattle for warble and lice control. The chemical is highly toxic to bald eagles, red-tailed hawks, black-billed magpies, and other bird species. Based on wildlife concerns, the California Cooperative Extension Office will advise users of the compound of tech-

niques to minimize exposure to wildlife and will implement a monitoring program to try to quantify the magnitude of the problem.

Region 2—The whooping crane (*Grus americana*) injured near Los Lunas, New Mexico, in early January has continued to improve. By late February, it flew well in short flights; however, it had not begun migration as of February 28.

Only two whooping cranes remained in New Mexico by the end of February; the others had migrated into Colorado. Thirty-one whooping cranes were identified during the over-wintering period, and several others may have been present because at least five birds lack the color markers placed on the birds for identification.

Region 2's Office of Endangered Species and Division of Refuge Management are involved in a cooperative effort to hold Endangered Colorado River fish species in selected refuges located along the lower Colorado River. Use of refuge aquatic habitats will permit the rearing of these fish to subadult size, thus maximizing their chances of survival when reintroduced into historical stream habitats. The first such refuge stocking consisted of approximately 300 Endangered bonytail chubs (*Gila elegans*) transplanted to a pond at Imperial National Wildlife Refuge in Arizona. As fry and fingerlings become available from Dexter National Fish Hatchery

(continued on page 10)

Current Status of the Chapman Rhododendron

Jacksonville, Florida, Endangered Species Field Station

The Jacksonville Endangered Species Field Station recently received a report entitled "Population Survey, Monitoring Program and Commercial Availability of *Rhododendron chapmanni*." Under an Endangered Species Act Cooperative Agreement, the Fish and Wildlife Service contracted with the Florida Game and Fresh Water Fish Commission, with the concurrence of the Florida Department of Agriculture and Consumer Services, for a survey of the current status of this Endangered plant. The Commission, in turn, contracted with the Florida Natural Areas Inventory, part of The Nature Conservancy, for the survey work.

The Chapman rhododendron is a small (0.5-2 meters tall), evergreen shrub of the heath family (Ericaceae). It has light pink flowers and blooms during March and April. The shrub is found on pinelands in three disjunct populations, two in the Florida panhandle and one in northeast Florida. Almost all of the habitat where the Chapman rhododendron is found is owned by the St. Joe Paper Company, which is voluntarily protecting some of the sites. The Nature Conservancy is also working to preserve additional locations.

The table below shows the current population status. Fluctuations in population numbers between 1979-1984 are due mostly to more intensive surveys.

The 1985 survey revealed a population decrease, due primarily to habitat destruction in Gulf County, where the population may have been reduced by almost one-half. Populations were reduced by intensive silvicultural practices, which can include bedding the soil, machine chopping, and the use of herbi-



Chapman rhododendron (*Rhododendron chapmanni*)

cides and fertilizers. At the Gulf County population site, the area has been clear cut, site prepared, and, in some cases, planted with slash pine (*Pinus elliotii*)

where longleaf pine (*P. palustris*) originally grew. Chapman rhododendron recovery in this area has been sparse to nonexistent.

Populations of the Chapman Rhododendron

Population Location	Number of Clumps*			
	1979**	1983***	1984	1985
Liberty and Gadsden Counties (near Hosford)	500	2500	2320	2320
Gulf County	500	500	1130	610
Clay County	50	20	32	32
TOTAL	1050	3020	3482	2962

*A clump is considered here as a cluster of stems rising from the ground.

**Estimates at time of listing.

***Estimates at time of recovery plan preparation.

Visiting Peregrine Demonstrates Restoration Success

by Judy Jacobs and Glenn Kinser
Annapolis, Maryland, Office of Ecological
Services and Endangered Species

Last summer, the Annapolis office staff received a dramatic demonstration that the peregrine falcon (*Falco peregrinus*) reintroduction program is working. On July 30, shortly after 5:00 p.m., an office employee spotted an immature peregrine falcon in a parking lot near one of the buildings in this industrial park area. The falcon held in its talons a large, apparently recently killed pigeon.

After flying briefly about the area, the peregrine carried its prey across the street to our own office's parking lot, where it settled down for a leisurely meal. The peregrine seemed quite accustomed to people, apparently unruffled by the human spectators a mere 15 feet away who clicked cameras and videotaped the entire event. Some 45 minutes later, the sated peregrine stretched its wings and flew off to the northeast, leaving behind a mostly consumed pigeon carcass and a group of amazed people.

By tracing the peregrine's band numbers, we learned that it had hatched about 30 miles to the north at the U.S. Fidelity and Guaranty Building in Baltimore. This seemingly unlikely nest site has hosted peregrine families since 1978, when Scarlett, a peregrine that had been released in coastal Maryland the previous year, chose to nest on a ledge of the building's 33rd floor. In the years that followed, a number of male peregrines were introduced to her, but she did not mate successfully with them. She proved to have fine maternal instincts, however, for she readily accepted and raised captive-born peregrine chicks that were substituted for her own infertile eggs. Between 1979 and 1983, Scarlett successfully raised 18 foster chicks. Finally, in 1984, Scarlett bred successfully with a wild male peregrine (dubbed Beauregard) and together the pair raised four young.

Scarlett died in September 1984, apparently from complications arising from a throat infection. Within four days, however, Beauregard had paired with a new female, Blythe, who had been released the previous spring from a site in coastal New Jersey. Together, these birds fledged four of their own young, including the peregrine who entertained us this July.

Prior to the 1940's, some 350 pairs of peregrines nested in North America east of the Mississippi River. In the late 1940's, however, they began to rapidly disappear. Growing concern over this dramatic decline led biologists in 1964 to survey all of the known peregrine eyries (nest sites) in the eastern United



This peregrine falcon was sighted feasting on a pigeon at the parking lot of the FWS Annapolis office. In 1985, the count of young peregrines fledging in the eastern U.S. increased by more than 50 percent over the 1984 total.

States. To their dismay, not a single nesting peregrine was found. The culprit was found to be DDE, a principal metabolite of the persistent pesticide DDT. DDE contamination caused the birds to produce thin-shelled eggs that were easily crushed during incubation. The use of DDT was later banned by the Environmental Protection Agency in 1972.

In 1975, the Peregrine Fund at Cornell University began to reintroduce captive-reared peregrines to the wild by a process known as "hacking." This involves placing chicks in a suitable nest site (usually a tall tower, an existing building, or a cliff) and providing them with food until they have fledged and are on their own. When birds reared by this method become mature, they often return to their hacking area to nest. Scarlett, the matriarch of the Baltimore eyrie, was hacked in 1977 on the Maryland coast within 20 miles of her selected urban nest site.

Cornell's hacking program, which has received financial support from the FWS,

the U.S. Forest Service, and numerous State and private sources, has been tremendously successful in recent years. In the mid-Atlantic region, peregrines have been successfully hacked from seven sites in Maryland, five sites in Virginia, and even a site in Washington, D.C. When a pair of peregrines began showing interest in nesting on the Chesapeake Bay Bridge in 1983, the Maryland Wildlife Administration installed a nest box beneath the bridge. This year, three young were fledged from the Bay Bridge nest.

As shown in the table below, the number of wild pairs established in the East has increased steadily since 1980, when the first successful nesting of reestablished peregrines was observed. The Peregrine Fund predicts that, if its current rate of increase is sustained, the peregrine population in the eastern U.S. will reach pre-DDT levels around 1990—a true success story in the history of endangered species restoration.

Nesting Success of Free-living Peregrine Falcons in the Eastern U.S.

Year	Pairs	Pairs Laying Eggs	Young Fledged
1979	3	2	-----
1980	3	2	4
1981	7	4	10
1982	10	6	12
1983	17	8	23
1984	27	12	30
1985	38-40	25	46

Editor's Note: In late 1985, most of Cornell's breeding peregrines were moved to The Peregrine Fund's World Center for Birds of Prey (5666 West Flying Hawk Lane, Boise, Idaho 83709).

Regional Briefs

(continued from page 8)

(NFH), they will be stocked into closed aquatic habitats on Havasu, Imperial, and Cibola National Wildlife Refuges.

During February 6-8, biologists from the Dexter NFH, Arizona State University, Arizona Game and Fish Department, Nevada Department of Wildlife, and Utah Division of Wildlife Resources collected 589 Endangered woundfin (*Plagopterus argentissimus*) from the Virgin River in Utah and Arizona. The group had hoped to collect up to 6,000 woundfin for reintroduction as experimental populations in the Hassayampa River and Tonto Creek in central Arizona. Because of the small number of fish taken, all were moved to Dexter NFH in New Mexico.

Spawning this spring should supply sufficient numbers of woundfin for late summer stocking into the wild. The low numbers of woundfin found in the Virgin River is surprising since past surveys have given indications of a much larger population. Population monitoring of woundfin has been occurring since 1977. The Woundfin Recovery Team will check this population again within the next 2 months.

FWS representatives from the Office of Endangered Species and Division of Realty met with U.S. Forest Service, National Park Service, Texas Parks and Wildlife Department, Texas General Land Office, and Texas Nature Conservancy representatives in late February to discuss species protection goals and potential acquisition sites as they relate to recovery efforts.

At a recent meeting of the Texas Plant Recovery Team, recovery efforts for listed plants were reviewed and changes or additions were made to the candidate list of Texas plants. Priorities were set regarding status survey proposals and future plant listings. In particular, the need for better definition of habitat requirements was discussed, as well as the need to locate additional populations of several species.

Region 3—On January 24-25, John Sidle of the Region 3 staff attended the Endangered Species Prairie Provinces Workshop Program in Edmonton, Alberta, Canada. The meeting, organized by the Federation of Alberta Naturalists, included a session on the piping plover (*Charadrius melodus*). The piping plover was recently added to the U.S. List of Endangered and Threatened Wildlife and is also listed as endangered by Canada's Committee on the Status of Endangered Wildlife.

Because the plover is a migratory bird, the Canadian Wildlife Service (CWS)

wants to cooperate with the FWS in the species' conservation. The CWS has begun drafting a management plan to be coordinated with FWS' recovery plans, which are currently being developed for the piping plover populations on the Atlantic coast and Great Lakes/Northern Great Plains.

Endangered Species Act-Section 6 cooperative agreements have been signed between the FWS and the Iowa Conservation Commission for the conservation of plants, and with the Indiana Department of Natural Resources for wildlife conservation. These States are now eligible to apply for grant funds as authorized by the Act.

A meeting of the Kirtland's Warbler Recovery Team was held in Lansing, Michigan, on February 18 and 19. Among the topics discussed were the management of the species' habitat at Camp Grayling and an FWS research proposal to color-mark (via plastic leg bands) as many as 160 Kirtland's warblers (*Dendroica kirtlandii*) annually following their fledging period.

A lone male Kirtland's warbler was sighted last June through July among the jack pines in southern Ontario. This is only the third Canadian location—the second in Ontario—where this songbird has been sighted. To protect the bird, the site has been disclosed only to officials of the Ontario Department of Natural Resources.

Region 4—A public hearing on the proposal to list the flattened musk turtle (*Sternotherus depressus*) as a Threatened species was requested by the Alabama Coal Association and was held in Birmingham, Alabama, on February 6, 1986. Just prior to the public hearing, the final report on a study of the turtle, conducted by Dr. C. Kenneth Dodd, Jr., of the FWS' Denver Wildlife Research Center station in Gainesville, Florida, and sponsored by the Office of Surface Mining, was received. The comment period was extended until March 18, 1986, to allow for review and comment on the new information, which was not available at the time of the listing proposal.

Only two specimens of the Endangered Culebra giant anole (*Anolis roosevelti*) have ever been collected. One of these provided the first description of the species in 1931, while the second was collected in 1932 and became the last specimen to be seen by biologists. The species was listed as Endangered in 1977, although some experts believed it was already extinct. Over the past few years, several short-term searches have taken place on Culebra Island without success; however, incidental reports by local residents

suggest that the giant anole may have been seen as recently as 1978.

In an effort to confirm the species' existence, the Commonwealth of Puerto Rico, aided by Endangered Species Act-Section 6 funding, plans to conduct a search for the anole in remaining potential habitat, the majority of which lies within the Culebra National Wildlife Refuge. Public assistance will be enlisted through local radio programs, and meetings between researchers and local science teachers and their students. Over a 6-month period, the search will include general ground surveys, day and night transect surveys, periodic intensive observations from elevated blinds in sites which appear to be optimal giant anole habitat, and gathering information from local residents.

The FWS recently received a status survey report on *Amphianthus pusillus*, a Category 2 listing candidate, in South Carolina. The survey for this plant was conducted by Doug Rayner, botanist with the South Carolina Heritage Program, and involved an extensive search of 65 granite outcrops throughout the State. Only three outcrops were found to have an *A. pusillus* population. All populations have been impacted by off-road vehicles and heavy recreational use. This plant also occurs in Georgia and Alabama. A status review is currently being conducted by the Jackson, Mississippi, Endangered Species Field Office to determine if a proposed listing is justified.

The Jacksonville, Florida, Endangered Species Field Station received a final status survey report and taxonomic evaluation on five small Florida mammals. The work was done by the Florida State Museum staff through the Florida Cooperative Fish and Wildlife Research Unit. The five mammals surveyed were the Sherman's short-tailed shrew (*Blarina carolinensis shermani*), the Homosassa shrew (*Sorex longirostris eionis*), the Pine Island rice rat (*Oryzomys palustris planirostris*), the Sanibel Island rice rat (*O. p. sanibeli*), and the Chadwick cotton mouse (*Peromyscus gossypinus restrictus*). All are Category 2 listing candidates and occur only in Florida.

The Homosassa shrew was found to still occur at the type locality at Homosassa Springs in Citrus County, where it inhabits hydric hammock forest. The shrew was not found in similar habitat at the nearby Crystal River. Considerable loss of hydric hammock has occurred in Citrus County, although a substantial amount remains around the type locality.

Sherman's short-tailed shrew was not found at the type locality near Fort Myers in Lee County. The most recent record for this shrew is from two speci-

(continued on next page)

Regional Briefs

(continued from previous page)

mens collected in 1981, so it is believed that the subspecies still exists, even if extirpated at the type locality by habitat conversion.

The Pine Island and Sanibel Island rice rats were both found to be abundant in suitable habitat. It appears that these two taxa may actually be the same subspecies but distinct from the mainland subspecies (*O. p. coloratus*). These island rice rat populations face increasing threats from the invasion of their wetland habitat by woody plants.

Despite intensive trapping efforts, the Chadwick cotton mouse could not be located in its previously known range on Manasota Key in Sarasota and Charlotte Counties. The subspecies appears to be extinct, probably due to habitat destruction and predation by house cats on this heavily settled key.

The February Regional Brief item on the 1985 Lower Mississippi River Valley Interior Least Tern Survey should have indicated that the survey included the Mississippi River from Baton Rouge, Louisiana, to the Kentucky/Tennessee State line (not the Missouri/Arkansas State line). Twenty-two colonies of the Endangered interior population of the least tern (*Sterna antillarum*) were confirmed or suspected on the Mississippi River from the Kentucky/Tennessee State line downstream to the confluence of the Arkansas River and the Mississippi. Over this same stretch of river, 1,213 adult interior least terns were observed on three surveys (June 17-18 = 9 terns, June 20-22 = 422 terns, July 18-19 = 782 terns). Further south along the Mississippi, 60 interior least terns were observed but no colonies were located. Four interior least tern colonies (approximately 80 adult terns) were observed along the Arkansas River; no terns were observed on the Red River.

Region 5—Three new hibernating colonies of the Endangered Indiana bat (*Myotis sodalis*) were found during this year's winter bat surveys—two in West Virginia and one in New York State. The New York colony is the northernmost hibernating site known for the species.

A colony of approximately 3,000 individuals of another Endangered bat, the Virginia big-eared (*Plecotus townsendii virginianus*), was found at a historical colony site in West Virginia. This is the largest known big-eared bat colony in the East. The cave housing these bats is closed to visitors during the winter when the bats are hibernating.

A coordinated effort to determine causes of a multi-State freshwater mussel die-off in lakes and major river systems has been initiated by Regions 3, 4,

and 5. Several Endangered mussel species could be seriously impacted.

Region 7—In Region 7, the only publication available to State and Federal agencies and the public that describes Alaska's plant listing candidates is a 59-page booklet written by Dr. David F. Murray of the University of Alaska, Fairbanks Museum. This guide, published cooperatively in 1980 by the U.S. Forest Service (USFS) and Bureau of Land Management (BLM), now requires substantial revision in order to account for research and status surveys conducted during the past 6 years. An interagency agreement is being executed among all major Federal land managing agencies in Alaska—USFS, BLM, and National Park Service—to cooperatively fund a revised edition of this important publication. It is hoped that the new booklet will increase awareness and stimulate further research on the candidate plants of Alaska.

Region 8—The Cape Sable seaside sparrow (*Ammospiza maritima mirabilis*) occupies seasonally flooded interior prairies in extreme southern Florida. Because of developmental pressures and habitat changes in this area, there is a need to identify both existing populations and suitable habitat for these sparrows. As part of the effort to identify suitable habitat, the U.S. Army Corps of Engineers funded a workshop in February 1985 to develop a habitat model for the Cape Sable seaside sparrow. Representatives from the Habitat Evaluation Procedures Group of the FWS Western Energy and Land Use Team and authorities on the sparrow developed a draft Habitat Suitability Index (HSI) model.

Based on the consensus of workshop authorities and on summer field studies conducted by the Florida Cooperative Wildlife Research Unit, a model was developed that has a significant positive correlation between habitat ratings assigned by a sparrow authority and the HSI model output. The HSI model did not show a correlation with sparrow population density data collected during the single season of study. Further efforts will be required to more completely understand the habitat needs of this sparrow, and to determine why the birds are not occupying areas of apparent optimal habitat. In the interim, the HSI model provides a working tool that can be used to identify suitable habitat.

Until recently, Buldir Island, in Alaska's far western Aleutian Islands, was thought to be the only breeding place of the Aleutian Canada goose (*Branta canadensis leucopareia*). Formerly abundant throughout the Aleutians, *B. c. leucopareia* has been the focus of an intensive recovery program since 1974. In 1979, a small population of breeding

birds resembling Aleutian geese was discovered in the Semidi Islands (western Gulf of Alaska), and a third population of Aleutian-like geese was found on Chagulak Island (eastern Aleutians) in 1982. Identification of these recently discovered populations could help reclassify the birds from Endangered to Threatened.

The Alaska Office of Fish and Wildlife Research used mitochondrial DNA sequence analysis to determine genetic relationships among birds from Buldir, Chagulak, the Semidis, and the nearest mainland populations of small Canada geese. Eggs collected from active nests last June were artificially incubated. Hand-reared goslings were transported to California, where Dr. Gerald Shields (University of Alaska-Fairbanks, on sabbatical at the University of California, Berkeley) completed the laboratory analysis.

Results indicate that the three island populations may be regarded as one genetically homogeneous group that is distinguishable from both the cackling goose and the Taverner's goose. The evidence strongly supports the view that Chagulak and Semidi birds are relict populations of a formerly more continuous distribution along the Aleutian arc and the Alaska Peninsula, and should now be considered as valid range extensions of the Aleutian subspecies of the Canada goose.

This research represents the first attempt to use the analysis of mitochondrial DNA to define avian genetic relationships at the subspecies and population levels.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works *only* for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service *will not* deliver it.

New Publication

Bald Eagle Production in the North Central Region, a consolidation of thirteen years of bald eagle breeding activity data, is available from the Region 3 Endangered Species Office. Requests for copies should be sent to the U.S. Fish and Wildlife Service, Office of Endangered Species, Federal Building—Fort Snelling, Twin Cities, Minnesota 55111.

Final Listings

(continued from page 1)

3.9 feet (1.2 meters) tall and has a slight dill fragrance. It grows in swamps, shallow pineland ponds, and wet pine savannas on the lowland plain of the mid-Atlantic coast.

Many of the freshwater wetlands once inhabited by the Canby's dropwort have been drained and converted to lowland pastures, pine plantations, and soybean fields. In other areas, road construction and other forms of development have altered groundwater tables, which also damages the habitat. Only 10 populations of the plant are known to remain in the States of Maryland, North Carolina, South Carolina, and Georgia; the species once also may have occurred in Delaware, but apparently is now extirpated in that State.

On March 28, 1985, the FWS proposed listing the Canby's dropwort as an Endangered species (story in BULLETIN Vol. X No. 4.), and the final listing rule was published February 25, 1986.

The only known Federal action that may affect the Canby's dropwort or its habitat is a planned Soil Conservation Service (SCS) channelization project for the upper Chester River watershed. Maryland's only known population of the plant is within the project area. Flexibility in final project design and fulfillment of the provisions in a January 13, 1983, interagency agreement between the FWS and the SCS will assist in developing solutions to potential problems.

Conservation Measures

Both species now receive the full protection authorized by the Endangered Species Act. Among the conservation

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	20
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	11
Plants	88	5	1	23	3	2	122	44
TOTAL	260	50	458	72	12	37	889	223**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 188

Number of species currently proposed for listing: 28 animals
30 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 45 fish & wildlife
23 plants

February 28, 1986

measures available under the Act are prohibitions on interstate or international trafficking in listed species without Federal permits; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to State endangered species conservation programs (for those States that have approved Cooperative Agreements with the FWS under Section 6 of the Act).

The take of listed animals, including the northern aplomado falcon, also is prohibited within lands under U.S. jurisdiction, except under Federal permit. For listed plants, the rule is different; it is against the Act to remove for possession listed plants if they are on lands under Federal jurisdiction, unless a Federal permit has been obtained. *Oxypolis canbyi*, however, is not currently known to exist on Federal lands.

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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Protection Given to Seven Species

During the month of March, the following four plants and three fishes were added to the U.S. List of Endangered and Threatened Wildlife and Plants:

Achyranthes rotundata

Achyranthes rotundata is a shrub ranging in height from 1.5 to 6.5 feet

(0.46 to 2.0 meters). It is covered with short, silvery hairs and bears small, inconspicuous flowers in a long inflorescence. Endemic to the island of O'ahu in the Hawaiian Islands, *A. rotundata* has been extirpated from most of its historical range because of agricultural, industrial, residential, and recreational development, along with an invasion of exotic shrubs and trees. Only two populations currently exist: one on a military reserve at Ka'ena Point that consists of two individuals, and the other at Barbers Point where approximately 400 plants remain on both Federal and private lands.

When *A. rotundata* was proposed for listing as Endangered on April 22, 1985 (see BULLETIN Vol. X No. 5), the largest sub-population of the species (80 percent of the total population) was located on land owned by the estate of James Campbell, one of two private landowners upon whose property this species grows. At present, however, only about 9 percent of the plants remain on this property. The entire population of *A. rotundata* decreased from an estimated 2,000 individuals to 400 between the years 1981 and 1985.

On March 26, 1986, the final rule to list *A. rotundata* under the Endangered Species Act (ESA) was published in the *Federal Register*. This ruling not only gives the species Federal protection, but it also invokes listing under Hawaii State law, which prohibits taking and encourages conservation.

Mauna Kea Silversword or 'Ahinahina

The Mauna Kea silversword (*Argyroxiphium sandwicense* ssp. *sandwicense*), historically abundant on the volcano for which it is named, has been reduced to only one known natural population located along the Wailuku River on the island of Hawai'i. It once numbered in the thousands, but today the subspecies consists of about 110 individuals, 95 of which are nursery-raised plants that the Hawaii Department of Land and Natural Resources transplanted into the area of the natural population.

This silversword species produces a globular basal rosette of dagger-shaped



Mauna Kea silversword

photo by Derral Herbst



Like many other Endangered plants, *Achyranthes rotundata* has been extirpated from most of its historical range by habitat destruction and degradation.

leaves that grow up to a foot (30.5 cm) long and are cloaked with silvery hairs. The rosettes grow for an average of 5 to 15 years, reaching a diameter of 2 feet or more before producing a narrow flowering stalk that bears heads of pinkish flowers. After flowering, plants with a single rosette die; individual rosettes of multiple-rosette plants also die.

Habitat destruction by feral animals (primarily goats, cattle, sheep, pigs, and horses) have eliminated the Mauna Kea silversword from much of its former range and vastly altered and degraded

(continued on page 4)



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of March:

Region 1 — The FWS Olympia, Washington, Field Office staff, in cooperation with the U.S. Forest Service, has completed its 1986 wintering bald eagle (*Haliaeetus leucocephalus*) surveys. The

Lava Creek roost was used for the second straight year, which confirmed it as a roost site, but there was insufficient time to verify another suspected roost site.

The north Idaho bald eagle study is progressing quite well. Six eagles have been captured for telemetry, and another 16 eagles will be trapped this spring.

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Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina,

Tennessee, Puerto Rico, and the Virgin Islands **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts,

New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming **Region 7:** Alaska

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Following a waterfowl disease workshop sponsored by the FWS Wildlife Disease Laboratory (WDL), a liaison was set up between the WDL and The Peregrine Fund to diagnose and control avian diseases in case of an infectious break-out in birds at the Fund's facility in Boise, Idaho.

The FWS Great Basin Complex at Reno, Nevada, assisted the Nevada Heritage Program (under the guidance of The Nature Conservancy) in initiating the FWS/Nevada cooperative program for plants. Nevada will contract out the survey of Ash Meadows' rare plants under the Endangered Species Act (ESA)-Section 6 program.

The FWS Office of Sea Otter Coordination, with assistance from the Pacific Northwest Solicitor's Office, prepared a re-draft of a proposed rule on translocation and containment of southern sea otters (*Enhydra lutris nereis*) within the immediate vicinity of San Nicolas Island, California. This draft describes the status of the species; identifies the details of translocation, research, and containment procedures; identifies translocation and management zones; states the applicability of ESA-Section 7; and sets forth the criteria for determining the success of the translocation. This comprehensive draft will be reviewed internally and by the Interagency Project Review Team before being published.

The FWS Sacramento, California, Endangered Species Office, in cooperation with staff from FWS Region 2 and the California Department of Fish and Game (CDFG), assisted in reintroducing the Endangered bonytail chub (*Gila elegans*) into the lower Colorado River. Approximately 300 bonytail were released into isolated backwaters on the Imperial National Wildlife Refuge (NWR). This recovery task is the first in a series of reintroductions of bonytail and Colorado squawfish (*Ptychocheilus lucius*) that are planned for the lower Colorado River basin. These Endangered fishes will be grown to a relatively large size ("grown-out") by CDFG before being released into the Colorado. This grow-out process is necessary to reduce bonytail and squawfish vulnerability to the many exotic predators now established in the lower Colorado River. CDFG used ESA-Section 6 grants (\$40,000 in FY 83 and \$60,000 in FY 85) to construct the rearing ponds for

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Correction: The photograph of the Florida grasshopper sparrow in BULLETIN Vol. XI No. 1 should have been credited to Jeffery A. Cox. The BULLETIN regrets the error.

Three Plant Taxa Proposed for Protection

Three species of plants were proposed by the Fish and Wildlife Service (FWS) during March 1986 for listing as Endangered or Threatened species. If the proposed rules are later made final, the following plants will receive Endangered Species Act protection:

San Rafael Cactus (*Pediocactus despainii*)

This small species was named for its discoverer, Kim Despain, and for the San Rafael Swell, a large geological upwarp in Emery County, central Utah, upon which the cactus was discovered in 1978. Surveys conducted since that time by various botanists have determined that the San Rafael cactus occurs in only two populations, each containing only 2,000 to 3,000 plants. Both populations, which are located approximately 25 miles (40 kilometers) from each other, are subject to habitat damage and overcollection. For these reasons, the FWS has proposed to list the San Rafael cactus as Endangered (F.R. 3/27/86).

Most of the cacti are in areas currently administered by the Bureau of Land Management (BLM), although some are on State of Utah lands. The type locality, which is near a popular camping area, is being heavily damaged by motorcycles and other off-road vehicles (ORVs). Individual plants have been found growing among crisscrossed motorcycle tracks. Further, approximately half of the area occupied by both *P. despainii* populations contains oil and gas leases and mining claims for gypsum and other minerals. Surface disturbances from associated exploration and from the annual assessment work required to maintain claims is an ongoing threat. Semiarid grasslands are a fragile habitat type, and are easily invaded by exotic and aggressive native plants when disturbed, displacing vulnerable elements of the native flora. Collecting of the cactus by hobbyists or commercial dealers is another potential threat, as *P. despainii* is considered a highly prized species.

One of the San Rafael cactus populations lies within a block of Federal land proposed for land exchange by Utah. If the site were to pass from Federal to State ownership, some benefits that would be available under the Endangered Species Act for its protection would be lost. For example, the prohibition on collecting listed plants without a permit applies only for lands under Federal jurisdiction.

If the listing proposal becomes final, Section 7 of the Act could affect BLM management of the habitat by requiring that agency to restrict recreational vehicle traffic to certain existing roads and to

exercise special care in administering leases and claims.

Comments on the proposal to list the San Rafael cactus as an Endangered species are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104, by May 27, 1986.

Running Buffalo Clover (*Trifolium stoloniferum*)

This short-lived perennial in the pea family (Fabaceae) is one of the four clover species native to the eastern U.S. The running buffalo clover historically occurred throughout a wide range. Documented specimens are available from Kansas, Arkansas, Missouri, Illinois, Indiana, Ohio, Kentucky, and West Virginia. Although the original numbers are not known, it was considered at least locally abundant in some areas. Today, however, the running buffalo clover survives at only one or two very small sites in West Virginia.

The precise reasons for this striking decline are not clear, but it is likely that *T. stoloniferum* was to some extent dependent on the "buffalo" or bison (*Bison bison bison*) that once roamed the eastern U.S. This large grazing animal provided soil enrichment, seed dispersal, and periodic intense disturbance of the habitat (which controlled encroachment of woody plants.) After

the extirpation of bison from the east, the abundance of the running buffalo clover decreased. Other factors contributing to the species' demise could include clearing of its habitat for livestock grazing and growing crops, competition with introduced weedy plants, and other ecological changes.

By 1983, a published review of the running buffalo clover concluded that the species was possibly extinct. In summer 1984, however, two populations were located in West Virginia by Rodney Bartgis, who was then with the West Virginia chapter of The Nature Conservancy. One of the populations occurred at the edge of a mowed field and contained only four individuals. Botanists inspecting the site in summer 1985 were unable to find these plants, and the population probably is extirpated. What may be the only remaining population is located immediately adjacent to an ORV trail in Fayette County that provides access to a short stretch of the New River. A total of 18 plants is concentrated on approximately a single square yard (0.8 square meter) of privately owned land. Due to its low numbers, extremely limited range, and proximity to an ORV trail, the entire population is vulnerable to swift extinction from being run over, trampled, covered by trash, or killed by petroleum pollutants.

The running buffalo clover has been proposed for listing as Endangered (F.R. 3/10/86). Comments on the proposal are welcome, and should be sent to the Annapolis Field Office, U.S. Fish and

(continued on page 4)



The San Rafael cactus is a small, barrel-shaped species that reaches a maximum height of 2.3 inches (6 centimeters). Its attractive flowers measure about one inch (2.5 cm) wide, and are peach to yellow in color with a bronze tint.

photo by Kenneth D. Heil

Three Plants

(continued from page 3)

Wildlife Service, 1825 Virginia Street, Annapolis, Maryland 21401 by May 10, 1986.

Loch Lomond Coyote-Thistle (*Eryngium constancei*)

Despite its common name, this plant is not a thistle but an herb in the parsley family (Apiaceae). The plant is found only on the bed of Loch Lomond, a 7-acre (2.8-hectare) vernal lake in southern Lake County, California. Rain fills the lake bed in winter, but the waters evaporate in spring and early summer, leaving a seasonal meadow-like area in which *E. constancei* and other plants sprout, flower, and set seed. The volcanic soils of the lake basin, together with its particular hydrological characteristics and the surrounding topography, may account for the unique presence of the coyote-thistle. Two other vulnerable plant taxa found growing on the lake bed, the few-flowered navarretia (*Navarretia pauciflora*) and the many-flowered navarretia (*N. plieantha*), are Category-2 candidates

for Federal listing under the Endangered Species Act.

Approximately 15 percent of the coyote-thistle habitat was destroyed in July 1984 by an illegal dredge-and-fill operation. Because the landowner failed to secure the proper permits, he was fined by the county and ordered by the State to restore the damaged lake bed. However, his continuing plans to dredge and fill the entire lake bed, thereby threatening the coyote-thistle with swift extinction, led the FWS to give the plant emergency protection as an Endangered species on August 1, 1985. (See feature in BULLETIN Vol. X No. 9). This temporary classification expired March 29, 1986; the March 26, 1986, proposed listing will, if approved, make the protection permanent. In addition to the proposed dredge-and-fill project, the lake bed is being damaged by the dumping of trash and by heavy ORV use during the dry summer.

Section 404 of the Federal Water Pollution Control Act (Clean Water Act) makes the U.S. Army Corps of Engineers (COE) responsible for regulating the discharge of dredged or fill material into U.S. waters, including seasonal wetlands like Loch Lomond. The land-

owner would need a COE permit to carry out his proposed modification of the lake. Under Section 7 of the Endangered Species Act, the COE is required to confer with the FWS on any of its actions, including issuance of permits, that are likely to jeopardize the survival of a species proposed for listing.

Comments on the proposal to list the Loch Lomond coyote-thistle as an Endangered species are welcome, and should be sent to the Regional Director, Region 1 (address on page 2 of the BULLETIN), by May 26, 1986.

Available Conservation Measures

If these listing proposals later become final, all three plants will receive the maximum protection authorized under the Endangered Species Act. Among the conservation benefits provided by the Act are prohibitions on interstate or international trafficking in listed species without a Federal permit; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal funding of State endangered species conservation programs for those States that have approved cooperative agreements with the FWS. (California is among the States that have a signed agreement.)

Habitat conservation is addressed in Section 7 of the Act, which requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. If an agency finds that one of its activities may affect a listed species, that agency is required to consult with the FWS to find ways of achieving project goals while avoiding jeopardy to the species. Early planning almost always prevents potential conflicts.

Section 9 of the Act makes it illegal to remove for possession listed plants from lands under Federal jurisdiction, without a Federal permit. This provision will apply to the San Rafael cacti on BLM lands if the species is listed. The other two plant taxa occur on non-Federal property and would not receive Federal protection from collection; however, State laws and regulations may apply.



When its shallow waters seasonally evaporate, Loch Lomond becomes a meadow-like area that is the sole habitat of the Loch Lomond coyote-thistle.

Seven Species

(continued from page 1)

the vegetation of Mauna Kea. Although the remaining natural population of the Mauna Kea silversword has been fenced by the State of Hawaii, the enclosure is too low to be effective against the more recently introduced mouflon sheep, which threaten the plant's survival by grazing and browsing. The severity of this threat, in addition to the horticultural and ornamental interest in the plant, prompted the FWS to propose the

Mauna Kea silversword for listing as Endangered on March 6, 1985. (See story in BULLETIN Vol. X No. 4.) On March 21, 1986, the final rule was published.

Minnesota Trout Lily

The only plant species known to be endemic to the State of Minnesota, the Minnesota trout lily (*Erythronium pro-pullans*) is found at 26 small sites in Rice and Goodhue Counties along the Cannon, Straight, and Zumbro Rivers. This

member of the lily family grows to about 6 inches (15 centimeters) tall and has one pair of mottled green, pointed leaves arising from near the base. A single bell-shaped flower, ranging from pink to pale violet to gray-white, appears in April or May at the end of a slender, leafless stalk.

Approximately 8,000 plants are estimated to exist, some occurring on privately owned property and some on conservation lands. Although four of the populations are protected (one found

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within a State park, one within a nature center, and two on land owned and managed by The Nature Conservancy), they still could be lost through inadvertent habitat alteration or natural population fluctuations. Several colonies of the Minnesota trout lily were destroyed some years ago by road construction, agricultural development, and recreational activities; many of the remaining plants still face similar threats. Wild-flower collectors could also reduce populations at the more accessible sites.

On May 3, 1985, the Minnesota trout lily was proposed for listing as Endangered due to the variety of human-related and natural problems it faces (see BULLETIN Vol. X No. 5). *E. pro-pullans* is officially listed as endangered by the State of Minnesota and is afforded limited protection from taking, transporting, and sale under State law. With the March 26 publication of the final rule, this species now receives additional protection under the Federal ESA.

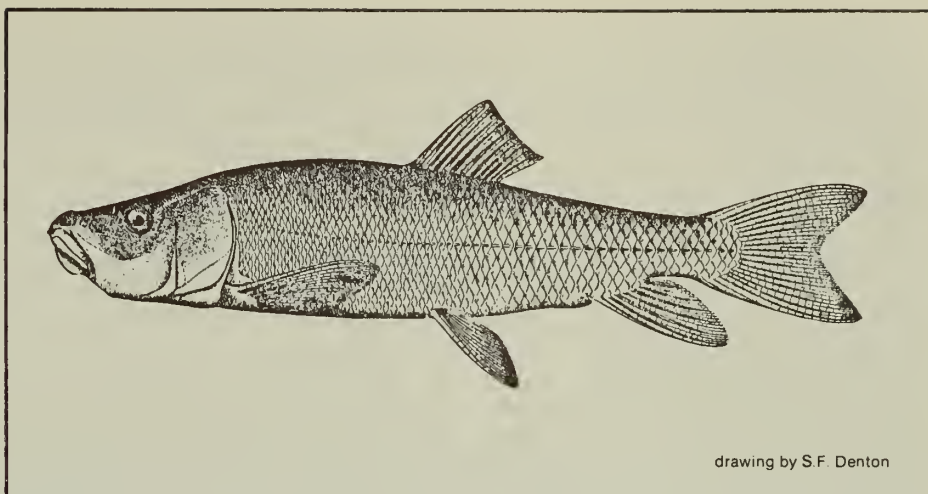
Hymenoxys texana

This member of the aster family is a small, single-stemmed or branching annual that reaches up to 3.9 inches (10 cm) tall with yellowish blooms that appear in late March to early April. Growing in poorly drained swales or depressions in open grasslands, the species occurs in the northern part of the Gulf Coastal Prairie. Only a single known population of *H. texana* currently exists, and it is located near Houston, Texas, in Harris County.

The most serious threat to this species is habitat destruction. At the time the proposed rule to list *H. texana* as Endangered was published (March 6, 1985), three populations of the species were known to survive (see BULLETIN Vol. X No. 4). Since then, however, two of the populations have been destroyed by residential development, and the remaining plants are currently jeopardized by the same threat. If the development continues as anticipated, the species could become extinct. With the final protection of the ESA now on its side (F.R. 3/13/86), however, the destiny of this Texas plant may improve.

June Sucker

The June sucker (*Chasmistes liorus*) is a fish that is endemic to Utah Lake, the largest freshwater lake located entirely within the State of Utah. It uses the lower portion of the Provo River, the largest tributary of the lake, for spawning and larval rearing. Although this fish was once extremely numerous and an important part of the commercial fishery of Utah Lake, it has drastically declined over the years due to habitat alteration, competition and predation by exotic species, and illegal killing of adults dur-



drawing by S.F. Denton

June sucker

ing the spawning run. Recent population estimates for the June sucker are not available, but it is suspected that fewer than 1,000 adult fish currently exist.

Habitat modification, a major factor in the species' decline, has occurred through the diversion of water for irrigation, municipal, and industrial purposes. The possibility of further modification associated with the Central Utah Project, a federally funded water development system now under construction, could impact the spawning habitat of the June sucker. Another threat to the survival of *C. liorus* is competition and predation from over 20 exotic fish species that have been introduced in Utah Lake during the past 100 years. These detrimental factors, in addition to the illegal killing of the species that occurs, prompted the FWS to propose the June sucker for listing as Endangered on July 2, 1984 (see BULLETIN Vol. IX No. 8),

and subsequently to publish the final listing rule (F.R. 3/31/86).

A designation of Critical Habitat is included as part of the final rule. The area comprises the lower section of the main channel of the Provo River from Utah Lake upstream to the Tanner Race diversion. There is a possibility that the Municipal and Industrial System of the Central Utah Project could affect the June sucker's Critical Habitat. Formal interagency consultation with the FWS under Section 7 of the ESA will be required to prevent any adverse impacts to the Critical Habitat.

Desert Pupfish

Another western fish listed as Endangered on March 31, 1986, the desert pupfish (*Cyprinodon macularius*) was once common in the desert springs, marshes,

(continued on next page)



The desert pupfish is a small, laterally-compressed fish with a rounded body shape. Adults rarely grow larger than 2 inches (75 mm) in total length.

photo by Robert K. Liu

Seven Species

(continued from page 5)

and tributary streams of the lower Gila and Colorado River drainages in the States of Arizona and California, and in Mexico. It formerly occurred also in the slow-moving reaches of some large rivers, including the Colorado and Gila, as well as the San Pedro and Santa Cruz. Currently, the species is known from only two of its historical locations in the United States (Salton Sea tributaries in California, Quitobaquito Spring in Arizona), and it is believed to inhabit the Colorado River system in the Rio Sonoyta drainage and Santa Clara Slough in Sonora, Mexico, although recent surveys indicate that the Mexico populations may not be viable.

During the 1880's, many desert rivers began experiencing major erosional cycles due to overgrazing, resulting in permanent water loss in numerous desert pupfish streams and the drying up of the shallow, littoral areas preferred by the species. The construction of mainstream dams for irrigation and flood control also eliminated the marshy sidepools in the Colorado River that were utilized by desert pupfish; this, in turn, forced them into areas where they were vulnerable to predators or outcompeted by native and exotic species. Although the desert pupfish is extremely hardy in many respects, it cannot tolerate predation or unnatural competition, and thus it is readily displaced by exotic fishes. These factors, in combination with adverse effects to the species from the application of agricultural pesticides, have reduced desert pupfish numbers in most habitats to such low levels that long-term survival prospects are poor.

Critical Habitat was designated in the final listing rule for the desert pupfish to include an area of Quitobaquito Spring in Pima County, Arizona, and sections of San Felipe Creek, Carrizo Wash, and Fish Creek Wash in Imperial County, California. The Critical Habitat areas are comprised of both private and Federal lands. The Federal agencies involved (National Park Service and Bureau of Land Management) have informed the FWS that the habitat is not expected to be adversely affected by any of their current activities.

Railroad Valley Springfish

The Railroad Valley springfish (*Crenichthys nevadae*), proposed for Endangered Species Act listing on April 17, 1984 (see BULLETIN Vol. IX No. 5), is native to six thermal springs in Railroad Valley, Nye County, Nevada, and has been introduced into three springs outside of its historical distribution. All of the species' habitats have been altered by human activities, resulting in decreased springfish populations throughout its range.

The diking of springpools, diversion and channelization of outflow creeks, and pumping of underground aquifers have reduced suitable habitat for the Railroad Valley springfish. The presence of exotic fishes in the extremely limited habitat of the species also poses a serious threat to its survival. Exotic fishes are increasing in Nevada waters, especially in spring systems in the southern portion of the State, and they are eliminating or severely decreasing many native fish populations.

On March 31, 1986, a final rule was published in the *Federal Register* to list the Railroad Valley springfish as a Threatened species. As part of the final

rule, Critical Habitat was designated for the species to include the six springs within its historical range, their outflow pools, and associated streams and marshes located in two areas of north-eastern Nye County. A 50-foot riparian zone around the springs was also included to protect and maintain the physical and chemical characteristics of the aquatic environment. The area designated as Critical Habitat does not include the entire habitat of this species; however, all waters inhabited by the fish will receive protection under the ESA.

Available Conservation Measures

Among the conservation measures that are now available to each of these newly listed species are a requirement for the FWS to develop and implement recovery plans, possible Federal funding, and prohibitions from certain practices, such as interstate and international trafficking in these species without a permit.

Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species or its Critical Habitat. The Federal agencies involved with these listing rules are aware of their responsibilities to protect listed species. These Section 7 provisions apply to all seven newly listed species, even though a formal designation of Critical Habitat was not part of the final listing rules for the plants.

Under Section 9 of the Act, the take of listed animals without a Federal permit is prohibited, except for the Railroad Valley springfish, which is threatened by habitat alteration or disturbance rather than direct taking. For this species, a special rule allows take for special purposes (e.g., educational, scientific, enhancement of propagation) without the need for a Federal permit, if a State collection permit is obtained and all other State wildlife conservation laws are satisfied. For listed plants, the rule is different; it is unlawful to remove Endangered plants from only those lands that are under Federal jurisdiction. This protection now applies to *Achyranthes rotundata*, which is found on U.S. military lands. State laws against taking these species, however, may apply.



The presence of exotic fishes in the extremely limited habitat of the Railroad Valley springfish presents a serious threat to this species.

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.



photo by Norman Myers, courtesy of World Wildlife Fund-U.S.

Nile crocodile

Reclassification Proposed for Ranched Nile Crocodiles in Zimbabwe

The FWS has proposed reclassifying ranched populations of the Nile crocodile (*Crocodylus niloticus*) in Zimbabwe from Endangered to "Threatened due to Similarity of Appearance" (F.R. 3/7/86). Such a reclassification, authorized under Section 4(e) of the Endangered Species Act, would constitute an acknowledgement by the FWS that the ranched populations have recovered but that certain trade regulations are needed to protect Endangered wild populations. The reclassification also would allow regulated U.S. trade in animals from these populations, subject to all provisions of U.S. and Zimbabwe laws and provided that the requirements of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are satisfied. Crocodiles in all other populations, including wild populations in Zimbabwe, will remain listed as Endangered, and their importation into the U.S. for trade will continue to be prohibited.

Historically, the Nile crocodile occurred throughout much of Africa and along the Mediterranean coast as far west as Tunis and as far north as Syria. Today, however, it is confined to the lower Nile, tropical and southern Africa, and Madagascar. Its decline was due to overexploitation for the leather industry, killing because of potential threats to people or livestock, and a mistaken notion that crocodiles compete for desirable fish species. The Nile crocodile was listed by the FWS as Endangered throughout its range in 1970.

Some crocodile populations are continuing to decline, while others apparently have stabilized or are even increasing. In some areas, including parts of Zimbabwe, the damming of swiftly flowing rivers to create lakes and

lagoons has increased the amount of habitat available for the crocodile. Zimbabwe, along with a number of other African countries, now recognizes the crocodile as a valuable natural and economic resource to be maintained.

At the 1983 CITES conference in Botswana, ranched populations of the Nile crocodile in Zimbabwe were moved from Appendix I to Appendix II. As a result, ranched specimens from Zimbabwe may be traded under CITES upon issuance of an export permit by that country's wildlife management agency. It is expected that most crocodile hides will be exported to European countries. The Appendix I classification of wild crocodile populations in Zimbabwe has not changed.

At present, there are five crocodile ranches in Zimbabwe, and they cumulatively collect less than 10,000 crocodile eggs from the wild each year under a permit from that country's wildlife management agency. The eggs are incubated at the ranches, and the young crocodiles are raised until they are approximately 5 feet (1.5 meters) in length, when they are killed and skinned. Although eggs collected under permit supply the bulk of the ranched crocodiles, attempts are being made to supply future needs for eggs from breeding stocks maintained at the ranches. The ranches also are required to release 5 percent of those crocodiles reared from wild collected eggs back into the wild.

Comments on the proposal to reclassify ranched populations of the Nile crocodile in Zimbabwe from Endangered to "Threatened due to Similarity of Appearance" are welcome from all interested parties, and should be sent to the Associate Director - Federal Assist-

ance, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240 by May 6, 1986.

Other Regulatory Changes

At the 1985 CITES conference in Buenos Aires, Argentina, *wild* populations of the Nile crocodile in nine countries (Zimbabwe not among them) also were moved from Appendix I to Appendix II and made subject to annual export quotas totalling 11,670 per year. As a result, the allowed number of specimens from these wild populations can be traded legally by most CITES parties, under the rules for Appendix II species. However, the March 7 proposal to reclassify ranched crocodiles in Zimbabwe under the Endangered Species Act does not apply to any wild populations, and importation into the U.S. of wild crocodiles or products made from them for commercial trade purposes remains prohibited under the Act.

On March 20, 1986, however, the FWS received a petition from Safari Club International to reclassify all wild populations of the Nile crocodile throughout its range from Endangered to Threatened (not "Threatened due to Similarity of Appearance") and to publish a special rule allowing import into the U.S. of legally taken sport-hunted crocodile trophies. In accordance with Section 4(b)(3)(A) of the Endangered Species Act, the FWS will issue a finding within 90 days of the petition's receipt as to whether or not substantial information has been presented that the petitioned action may be warranted and a status review should be initiated. The finding will be published in the *Federal Register*.

Efforts Continue in Southeast to Save Manatees

Region 4

Within the past year, the FWS has been active in Florida and Puerto Rico to save the Endangered West Indian manatee (*Trichechus manatus*). In Florida, studies of seasonal movements and habitat use have begun at Fort Myers, and a lagoon at Port Everglades has been modified to replace lost habitat. In Puerto Rico, information has been compiled that will help biologists assess the impacts of proposed activities on the manatee there.

Biologists with the FWS Sirenia Laboratory in Gainesville, Florida, recently captured and radio-tagged 19 manatees at the Florida Power and Light Company's warm water discharge canal at Fort Myers. This is the site of the largest winter aggregation of manatees in Florida, with 330 manatees recorded at the power plant and nearby Caloosahatchee River during the winter of 1984-1985. Manatees were instrumented with 16 VHF radio transmitters and three satellite radio transmitters to determine seasonal movements and habitat use in southwest Florida. Over 30 other biologists and volunteers from the FWS, Florida Department of Natural Resources, Florida Audubon Society, and other agencies and organizations assisted Sirenia project personnel in the captures on January 6-7 and 27-28.

Manatees have been provided a safe refuge away from dangerous boat traffic in Port Everglades. Approximately one year ago, the FWS Jacksonville Endangered Species Office was involved in an Endangered Species Act-Section 7 consultation with Port Everglades authorities in Broward County concerning the

construction of a new berthing facility at the port. Shallow water habitat used by the manatee would be removed by development of the project. Manatees use the port facility extensively during the winter months to take advantage of a warm water discharge from a power plant.

To offset the loss of shallow water habitat, a plan was developed to create other habitat in a small lagoon owned by the port located adjacent to the warm water discharge canal. Manatees historically used this lagoon, but it was very shallow and most of it was unuseable during low tide. The plan was to dredge out the lagoon to a sufficient depth to allow manatees to use the area through all tidal cycles. In addition, at one end of the lagoon there was a plugged canal that once had been connected to the warm water discharge canal. The plug was to be removed to allow some of the warm water to be diverted into the lagoon, with the hope that manatees would begin to use this area as a refuge.

Work on the project was completed prior to this past winter season, and the first reports on manatee use are favorable. Compared to previous counts, more manatees are seen in the lagoon and are staying in the area throughout the tidal cycles. The port has initiated a study to record water temperatures in the lagoon and to monitor manatees in the area. The removal of the plug has diverted warm water into the lagoon, and has increased flushing.

In Puerto Rico, results from a recent U.S. Navy-funded study on the distribution of manatees provide information needed to assess impacts of proposed

activities. The report, entitled "The Distribution of Manatees and Sea Turtles in Puerto Rico, with Emphasis on Roosevelt Roads Naval Station," was prepared by Galen B. Rathbun, Thomas Carr, Nicole Carr, and Charles A. Woods. Monthly aerial surveys were conducted around Puerto Rico and weekly aerial surveys were conducted on Roosevelt Roads Naval Station (RRNS). Manatees were also surveyed from shore at the RRNS sewage treatment plant outfall (fresh water source) on a biweekly basis.

Most manatees were sighted in shallow, protected areas with submerged aquatic vegetation and a fresh water source. Over 50 percent were sighted along Puerto Rico's south coast and over 30 percent along the east coast (including RRNS and the northwest coast of Vieques Island). Lack of seasonal trends in the numbers of manatees sighted and the observation of calves throughout the year suggest that there is no well-defined breeding season.

Nevada Fish is Found Not in Danger

Because of new information indicating that the Fish Creek Springs tui chub (*Gila bicolor euchila*) is more abundant and widely distributed than once thought, and because threats faced by this fish have been removed, the FWS has withdrawn its 1984 proposal to list the subspecies as Threatened (F.R. 3/10/86).

This tui chub, which is endemic to the Fish Creek Springs system in Eureka County, Nevada, previously was considered vulnerable to predation by introduced sport fish species and by the harmful impacts of overgrazing livestock. It was proposed for listing on June 6, 1984 (story in BULLETIN Vol. IX No. 6). Subsequent status surveys in 1984 and 1985 found larger than expected numbers of tui chub fry. The increase could be due, at least in part, to reductions in the number of predatory, non-native sport fishes stocked into Fish Creek Springs. The Nevada Department of Wildlife has halted stocking of brown trout (*Salmo trutta*) and has reduced releases of rainbow trout (*S. gairdneri*). In addition, riparian vegetation is present around the springs and siltation is not a significant threat at this time.

The FWS will continue to monitor the fish and its habitat for future changes.



West Indian manatee

Ferret Fund Increases

by Al Langston

Wyoming Game and Fish Department

Donations to the Wyoming Game and Fish Department (WGFD) for the black-footed ferret program continue to come in, with more than \$6,000 received as of early March.

Funds have come from a variety of sources. Ten-year-old Toni Bonazza of Lander, Wyoming, donated \$12 from money she received for her birthday. Many other donations have been received in varying amounts from private individuals, as well as \$300 from Defenders of Wildlife.

School children have been particularly active in fundraising events. Since the first of the year, donations have come in from the following Wyoming schools: the Grant School 3rd grade in Casper; the 4th, 5th and 6th grades from Washington School in Laramie; the Lincoln Middle School Flora and Fauna Class in Green River; and the Lebhart School 2nd grade in Cheyenne. Donations also have come in from Jefferson



photo courtesy of Wyoming Game and Fish Department

Black-footed Ferret

County Open High School in Evergreen, Colorado.

WGFD Director Bill Morris thanks all those involved for their interest in the black-footed ferret project and other WGFD activities. "Without this kind of support," he said, "it would be difficult to

maintain Wyoming's wildlife resources at the quality we know and enjoy."

Anyone wishing to contribute to the ferret program should send donations to the Wyoming Game and Fish Department, Cheyenne, Wyoming 82002, Attention: Black-footed Ferret Fund.

Critical Habitat Proposal for Two Key Largo Species is Withdrawn

The FWS has withdrawn (F.R. 2/18/86) its proposal to designate Critical Habitat for two rare rodents of southern Florida, the Key Largo woodrat (*Neotoma floridana smalli*) and the Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*). Both subspecies were proposed for listing as Endangered with Critical Habitat on February 9, 1984. The Endangered listings became final on August 31, 1984, but the designation of Critical Habitat was deferred at that time in order to expedite the listing action.

Following the original proposal to list the two rodents as Endangered with Critical Habitat, certain landowners on North Key Largo expressed an interest in development of a Habitat Conservation Plan (HCP) pursuant to Section 10(a) of the Endangered Species Act. Under this provision, the FWS may issue a permit authorizing the take of listed species, incidental to otherwise lawful activities, provided that (among other things) the permit application is supported by an approved HCP. Implementation of such an HCP must ensure the long-term conservation of the species and must not appreciably reduce the species' likelihood of survival and recovery in the wild. Subsequent to the listing of the two Key Largo mammals, Congress allocated \$98,000, to be matched

with non-Federal funds, for use in developing an HCP. The FWS, which was charged with administering the congressional funding, entered into a grant agreement with the Florida Department of Community Affairs to prepare (in cooperation with Monroe County) an HCP for North Key Largo.

Between the land already acquired for Crocodile Lake National Wildlife Refuge and Florida Department of Natural Resources conservation projects, over half of the habitat occupied by the woodrat and cotton mouse on North Key Largo is publicly owned. The remainder, which is privately owned, would be subject to the beneficial conservation provisions of the HCP. Under the projected plan, most development probably would take place without widespread destruction of hardwood hammocks, with development to be clustered, particularly in areas that already have been cleared. Both animals require natural habitat, and avoid cleared or developed areas.

Under Section 7(a)(2) of the Act, Federal agencies are required to ensure that their activities are not likely to jeopardize the survival of a listed species, even when Critical Habitat has not been designated. Because of this, and because of the intensive land acquisition and planning processes now occur-

ring on Key Largo, the habitat of the two rodents has already been well delineated. No additional benefit would accrue from a formal Critical Habitat designation.

A draft HCP should be available for public review in the near future. Before a final decision on issuance of an HCP is made, an environmental impact statement on permit consequences will be developed.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313/763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

Condor Update

The first egg produced by the only remaining breeding pair of California condors (*Gymnogyps californianus*) was found broken in early March, probably the result of its extremely thin shell. As of April 8, biologists watching the pair did not know if the female will lay another egg this season. Only five California condors remain in the wild, and four of them are males.

Currently, there are another 21 condors in captivity at zoos in San Diego and Los Angeles, 13 females and 8 males. Two of the females are adults, one of the males is an adult, and another male is approaching maturity and could

be of breeding age; the other condors are immatures. Biologists hope that the captive flocks will produce offspring for release into the wild.

The FWS is appealing a district court decision that bars capture of the five wild condors for safekeeping and captive propagation. Capture of one of the wild males, however, has been authorized by the court since it is the only wild bird not genetically represented in the captive flocks. With such a small number of animals, it is essential to conserve as much of their genetic diversity as possible.

lupus baileyi) in parts of its historical range. The U.S. agreed to continued cooperation in the recovery of the wolf and to proceed toward plans for reintroduction. There are currently 27 certified-pure Mexican wolves in captivity in the U.S., and they will be used as the nucleus for reintroduction.

The 1986 Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*) survey in Texas has counted only 880 birds this spring, a 39 percent decline from 1985 and the lowest number in 21 years. The most notable declines occurred in the southern part of this Endangered prairie-chicken's range, and are attributed to continuing loss of habitat and heavy rains during the hatching period last year.

Birds on the Attwater Prairie Chicken NWR continue to do well, with 204 counted this spring. If this trend continues, the subspecies will soon be limited only to the 8,154-acre (3,300-hectare) NWR; the recovery plan calls for between 3,000 (to reclassify) and 5,000 (to delist) birds on 22,240 acres (9,000 ha) of public and private lands.

Region 3 — An agreement has been reached between the FWS and the Minnesota Department of Natural Resources for the preparation of a recovery plan for the recently listed Minnesota trout lily (*Erythronium propullans*).

Members of the newly appointed recovery team for the central U.S. population of the piping plover (*Charadrius melodus*) met in March to begin developing a recovery plan for the species. A plan also will be developed for the Atlantic Coast population of the plover by a recovery team headed by Region 5.

Region 3 received \$8,300 of Endangered Species Program funds to conduct a status survey on the prairie mole cricket (*Gryllotalpa major*). This Category-2 listing candidate, historically found in Kansas, Illinois, Missouri, Mississippi, and Oklahoma, appears to be threatened by loss of its prairie habitat.

A meeting of the Higgins' Eye Pearly Mussel Recovery Team is scheduled for April 30, 1986, at the National Fisheries Lab in Lacrosse, Wisconsin, in conjunction with the annual meeting of the Mississippi River Research Consortium. The mussel die-off and recent surveys and research are among the topics to be assessed by the team members.

The Indiana/Gray Bat Recovery Team is scheduled to meet on May 1, 1986, at the Museum of Natural History in Washington, D.C. Issues of particular concern to be addressed at the meeting include the recent population declines at a number of important hibernaculae, progress

Regional Briefs

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growing-out the bonytail and Colorado squawfish.

The San Francisco Bay Bird Observatory recently completed a draft report on the status and distribution of the salt marsh yellowthroat (*Geothlypis trichas sinuosa*), a Category-2 candidate for listing, in the San Francisco Bay area. Based on the 1985 breeding season, the current yellowthroat population includes approximately 570 breeding pairs, considerably more than the 166 pairs counted during the drought years of 1976 and 1977.

Region 2 — A 6½-year-old male whooping crane (*Grus americana*) was captured on Belen State Management Area in New Mexico after it was seen acting abnormally. Subsequent veterinary examination showed that the bird was emaciated, and radiographs indicated large tumor-like growths in the abdominal area. The bird died during surgery to examine the growths, which were found to be tubercles of avian tuberculosis, an untreatable illness.

A second adult whooping crane believed to have been injured near Los Lunas, New Mexico, in early January appears to have almost fully recovered. On March 4, she migrated into Colorado, and she was observed in the San Luis Valley on March 6.

An additional whooping crane was confirmed at Aransas NWR, making a total of 97 birds that reached the Texas coast. Survival of adults and subadults was unusually good during 1985. Eighty-one of the 84 birds that departed Texas in April 1985 returned to Texas this winter. By the end of March, 48 birds had departed from Aransas, heading northward. Migration is about a week earlier than normal.

During early March, the two subadult whooping cranes wintering near Brazo-

ria, Texas, were observed feeding on sprouting corn that had been treated with the chemical Contra G-15 carbofuran, which is known to be highly toxic to waterfowl. The birds were hazed from these sites until they departed to feed in estuarine areas. During late March, the same whooping cranes began feeding on sprouting sorghum grown from seed that had been chemically treated. Again, the birds were hazed until they left these sites.

Personnel from the New Mexico Department of Game and Fish and FWS Region 2 sampled the Pecos River for the bluntnose shiner (*Notropis simus pecosensis*) from Santa Rosa, New Mexico, to the Texas State line. The purpose was to check the status of this species, which is proposed for listing as Threatened (see BULLETIN Vol. IX No 6). Results of the survey will be forthcoming after the 16 samples are sorted and analyzed. Other fishes of note taken during the sampling include the blue sucker (*Cycleptus elongatus*), a Category-2 listing candidate, and the State-listed big-scale logperch (*Percina macrolepida*).

A meeting held with the National Park Service included a visit to Rattlesnake Springs in Carlsbad Caverns National Park. Plans were made to remove exotic fish species from the springs in order to reintroduce fishes native to the Pecos drainage, including the Endangered Pecos gambusia (*Gambusia nobilis*).

FWS representatives attended a Mexican Wolf Symposium in Saltillo, Coahuila, Mexico, in early March. The symposium was sponsored by the Universidad Autonoma Agraria Antonio Narro and Conservacion Ecologia de los Recursos Naturales. Up to 200 people were in attendance daily, including wolf experts from Italy and Canada. Discussions were held about what might be done to maintain the few wild wolves left and to reestablish the subspecies (*Canis*

of the cave-gating study, and summer habitat research.

Region 3 staff members are planning to work with the Hiawatha National Forest staff (in Michigan) on a project to determine the effects of intensive fishery management on eagles. Some concern has been expressed by the local National Audubon Society chapter that lake renovation may be detrimental to eagles in the area.

The Peregrine Falcon Release Group met on March 17. There are plans to release up to 40 peregrine falcons (*Falco peregrinus*) this year from the three Minnesota hacking sites, as well as new release sites in Illinois and Michigan.

A survey report prepared by Dr. Arthur Clarke for the U.S. Army Corps of Engineers on mussels of the St. Francis Floodway and a major tributary in Arkansas revealed interesting data on the Endangered fat pocketbook (*Potamilus capax*). This mussel was found throughout the area surveyed and at 75 percent of the study sites. It was the most common species found there, with an estimated 11,000 to 24,000 post-juvenile individuals in existence. Dr. Clarke has proposed to transplant the species to other rivers, including the White River in Indiana and two sites in the upper Mississippi River.

Region 4 — The Florida semaphore cactus (*Opuntia spinosissima*), a Category-2 listing candidate, has been reported in its native habitat in southern Florida for the first time in a decade. A report made by a private individual to the FWS, the Florida Natural Areas Inventory, and a university botanist has stimulated a reappraisal of the status of this species. Although the possibility is still unconfirmed, the plants living in the wild may represent a successful reintroduction of cultivated plants into the site from which they had been taken. Cultivated material is available for reintroduction because this large cactus has had some popularity as an ornamental.

FWS Caribbean Field Office personnel have reviewed the distribution of the Florida semaphore cactus in the Caribbean. The plant is present on the south coast of Jamaica and the Cayman Islands; it is not known to occur in the Bahamas, Puerto Rico, or the Virgin Islands (contrary to the current Notice of Review for plants). The cactus appears not to be present in Mexico.

The Alabama shovelnose sturgeon (*Scaphirhynchus platyrhynchus* ssp.) is a small, undescribed subspecies confined to the Mobile Bay drainage of Alabama and Mississippi. First reported from this system in 1930, the shovelnose sturgeon was initially documented in scientific

literature in 1955. Confirmed records of the species are uncommon. A status survey in 1955 captured only five individuals.

This fish historically ranged in over 1,000 miles of main channel habitat in the Mobile Bay system of rivers; however, only 15 percent of this historical habitat is known to support a population now. Another 24 percent is of marginal value as shovelnose sturgeon habitat. Impoundments, channel modifications, gravel mining, and water flow regulation are the primary threats to this species. The FWS is reviewing the status of the Alabama shovelnose sturgeon to determine if there are enough data available for a decision on whether or not a proposal to list the fish under the ESA is warranted.

A meeting of all agencies involved in sea turtle management at Cape Canaveral took place at Merritt Island NWR on February 28, 1986. Representatives from the refuge; FWS Jacksonville, Florida, Endangered Species Field Station; Canaveral National Seashore, Kennedy Space Center; Bionetics Inc.; and Canaveral Air Force Station reviewed the results of their 1985 sea turtle programs and discussed plans for the 1986 season. In 1985, a total of 4,600 loggerhead (*Caretta caretta*) and 150 green (*Chelonia mydas*) turtles nested on the 37 miles (68 kilometers) of beaches along Cape Canaveral. Approximately 44 percent of the nests hatched successfully, which marks a significant improvement from past years when over 90 percent of the nests were lost to raccoon predation.

The most successful program occurred on Merritt Island NWR, where 95 percent of the nests hatched because of a live-trapping and removal effort directed at raccoons. Canaveral National Seashore erected screens around 40 percent of the sea turtle nests deposited on its beaches. Most of the screened nests hatched, while most non-screened nests were destroyed by raccoons. The Air Force relied on a raccoon live-trapping program with some screening, which resulted in an overall nest success of 34 percent. More intensive nest protection efforts are planned by the Air Force in 1986 if funds permit.

A draft revision of the Florida Panther Recovery Plan has been completed. (The original plan was approved on December 17, 1981.) The draft update delineates new tasks that might be useful in recovery efforts, and reworks the plan into a standardized format common in recent recovery plans. It is being circulated for comment to all Federal and State agencies that are involved in Florida panther (*Felis concolor coryi*) recovery efforts, and to private agencies and individuals who are knowledgeable about panther biology.

Region 5 — Peregrine falcons have been sighted at three sites in New Hampshire and Vermont that were active in 1985. The outlook is optimistic for a banner season.

Region 6 — Whooping crane spring migration monitoring has begun. The 1986 spring flight is the 22nd migration monitored through the cooperation of many people from central Canada and the United States. The Records Center coordinator is Wally Jobman, of the FWS Endangered Species Office in Grand Island, Nebraska. Any sightings should be reported to State contacts as indicated in the Whooping Crane Contingency Plan; the State contacts will then report them to Mr. Jobman.

The information will be used to alert people in key areas of concern along the flyway and to provide sighting records for the Whooping Crane Recovery Plan and current studies in Canada and the United States.

The Wyoming Game and Fish Department (WGFD) has received funds from the FWS to assist with construction of a black-footed ferret (*Mustela nigripes*) captive breeding facility at the State's Sybille Research Unit near Wheatland, Wyoming. Currently, WGFD has four female and two male black-footed ferrets at Sybille. An attempt to breed these ferrets began in February 1986. The possibility of success this year is low because both males and one female are young, inexperienced animals. Success of this program will not be known before April.

Contributions totalling more than \$6,000 have been received by the WGFD Ferret Fund. The money has come from school children, other concerned individuals, and industry. (See story in this BULLETIN issue.)

Region 7 — In the December 1985 BULLETIN, we reported that the Environmental Protection Agency issued an experimental use permit authorizing the FWS to test the use of the toxicant Compound 1080 for eradicating introduced arctic foxes (*Alopex lagopus*) from uninhabited Kiska Island to promote the recovery of the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*) there.

During late March and early April, Alaska Maritime NWR biologist Fred Deines and animal damage control agent Wells Stephensen conducted pretreatment surveys of both target and non-target species on Kiska and successfully dispersed Compound 1080 baits around the periphery of the island. Preliminary results of the treatment are encouraging, as foxes are taking the baits and succumbing. Although this program has

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Regional Briefs

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been controversial, no alternate means to eliminate foxes are feasible on islands as large (695,598 acres), rugged, and remote as Kiska. If the program succeeds, it is hopeful that Aleutian geese and many other species of migratory birds will once again be able to breed on this Aleutian island.

Recovery Plan Update

The following recovery plans were recently approved by the FWS: *El Segundo Blue Butterfly Recovery Plan* (1/22/86); *Curtis Pearly Mussel Recovery Plan* (2/4/86); *Bald Eagle (Pacific States) Recovery Plan* (3/19/86); *Monito Gecko Recovery Plan* (3/27/86); *Puerto Rico Boa Recovery Plan* (3/27/86); and *Virgin Islands Tree Boa Recovery Plan* (3/27/86).

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone (toll-free) 800/582-3421.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	3	0	78	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	92	5	1	23	3	2	126	44
TOTAL	266	50	458	73	12	37	896	228**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 194

Number of species currently proposed for listing: 25 animals
29 plants

Number of Species with Critical Habitats determined: 95

Number of Cooperative Agreements signed with States: 46 fish & wildlife
25 plants

March 31, 1986

New Publication

Endangered Aquatic Ecosystems in North American Deserts with a List of Vanishing Fishes of the Region, a 62-page report by Jack E. Williams et al., may be ordered from the Desert Fishes Council, 407 W. Line Street, Bishop, California 93514. This 1985 publication contains technical information on the

status of 15 ecosystems of the United States and Mexico; their vanishing fishes, amphibians, reptiles, and invertebrates; and the threats to these species and their habitats. A limited number of copies is available; the only charge is \$1.00 for postage and handling.

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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18 Plants Proposed for Listing Protection

A total of 18 plant taxa were proposed by the Fish and Wildlife Service (FWS) during April 1985 for listing as Threatened or Endangered species. If the proposed listings are later made final, Endangered Species Act protection will be available as an aid to their survival and recovery.

Eight Florida Scrub Plants

The following eight plants are endemic to sand pine/evergreen oak scrub in south-central peninsular Florida, a unique habitat type that is vulnerable to modification or destruction:

• ***Lupinus aridorum* (scrub lupine)**—A biennial or short-lived perennial, this member of the pea family (Fabaceae) grows stems up to 3 feet (1 meter) tall from a soft, woody base. The pale flesh-pink flowers are borne on inflorescences that can reach approximately 5 inches (13 centimeters) in length. *L. aridorum* is known from only 15 sites, all on private lands, and the total population was only 339 plants at last count. Ten of the current sites are in Orange County between the city of Orlando and Walt Disney World. Orlando is one of the fastest growing cities in Florida, and many of the scrub lupine localities are considered prime property for development. The other five sites, in Polk County, also are threatened by habitat loss.

The scrub lupine was proposed for listing as an Endangered species on April 24, 1986. Seven other Florida scrub plants were proposed for listing in a separate notice published on April 10:

• ***Prunus geniculata* (scrub plum)**—This scraggly, heavily branched shrub, which belongs to the rose family (Rosaceae), grows to about 6 feet (2 m) tall. Its twigs are strongly zigzag, with spiny lateral branches, and the deciduous leaves have fine teeth along their margins. The white flowers, which appear in winter, are followed by a bitter, dull-red plum. Roughly 33 *P. geniculata* localities have been reported in Polk, Highlands, and Lake Counties, but none are within protected areas.



Lupinus aridorum

• ***Chlonanthus pygmaeus* (pygmy fringe tree)**—Another shrub, this member of the olive family (Oleaceae) typically grows up to almost 3 feet (1 m) tall, although specimens up to 13 feet (4 m) high are known. Its

white flowers bloom in late March, and are borne in showy panicles. The species is known from 20 sites, most of them consisting of only a few plants. Six of the sites are on the

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photo by Andy Robinson



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of April:

Region 2—A 7-year-old male whooping crane (*Grus americana*) belonging to the Rocky Mountain population was found dead on April 17 at Oxford Slough in Bannock County, southeastern Idaho, where he spent the previous five summers. The carcass was still in good condition when found. Evidence at the scene and from the subsequent necropsy showed that the cause of death was collision with a powerline. The post-mortem examination also indicated that the bird had avian tuberculosis, but apparently in the very early stages.

Fourteen crane researchers, managers, and administrators met in Reno, Nevada, in late March to discuss sexual maturity and pairing behavior in cranes. The meeting included a brainstorming session to increase the chances for pairing and reproduction in the Rocky Mountain whooping crane population. Eight recommendations were developed, with six of them being approved for implementation over the next 12 months.

A sick 4-year-old male whooping crane in the Rocky Mountain flock was discovered in the San Luis Valley of Colorado on April 9 and was transported to the Rio Grande Zoological Park in Albuquerque, New Mexico. The bird was emaciated, but preliminary tests failed to determine the cause. Its condition subsequently worsened to the point that it was euthanized to end the bird's suffering. A necropsy revealed that the whooper had avian tuberculosis, a disease for which there is no known antibiotic. This was the third case of avian tuberculosis in the Rocky Mountain whooping crane population this spring. The crane first determined to have the disease died in March.

As part of a Woundfin Recovery Team meeting held in St. George, Utah, on April 14-15, woundfin (*Plagopterus argentissimus*) populations were monitored in the Virgin River. The results indicate that the red shiner (*Notropis lutrensis*) continues to expand its range up the river. Competition with this exotic is a primary reason for depressed woundfin populations. Continued monitoring of the Virgin River will be required to fully determine the impact of red shiners on woundfin populations. Despite problems experienced last year with an increase in salinities and decreased flows in the Virgin River, woundfin did reproduce in the upper portions of the river. A few Virgin roundtail chub (*Gila robusta seminuda*) also were discovered during the monitoring for woundfin. This chub is expected to be proposed for listing in the near future.

The Apache Trout Recovery Team met April 28 at Pinetop, Arizona. Items discussed at the meeting included the successful rearing of the Apache trout (*Salmo apache*) at Williams Creek National Fish Hatchery. Due to this success, Apache trout from this hatchery will be reintroduced into streams on U.S. Forest Service lands. This marks the first time hatchery-cultured Apache trout have been reintroduced. The hatchery hopes to produce 100,000 Apache trout next year.

The second meeting of the Desert Fishes Recovery Team was held this month at the Tucson headquarters of the Arizona Game and Fish Department.

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U.S. Fish and Wildlife Service Washington, D.C. 20240

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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Five Clams Believed in Danger of Extinction

Five freshwater clams, all restricted to areas in the Tombigbee River system in Mississippi and Alabama, were proposed by the FWS on April 7, 1986, for listing as Endangered species. Much of their historical habitat has been modified by reservoir and barge canal construction, and the remainder is threatened by siltation and gravel dredging. The modification of the free-flowing Tombigbee River into a series of impoundments to form a barge canal has also resulted in direct destruction of these clams:

Marshall's mussel (*Pleurobema marshalli*), a bivalve mollusk about 60 mm long, 50 mm high, and 30 mm wide, was historically known from the Tombigbee River main stem just above Tibbee Creek near Columbus, Mississippi, down to Epes, Alabama. The only remaining viable habitat for this species in the Tombigbee River is a gravel bar in a bendway (a loop cut off from the river) in Sumter County, Alabama. A few individuals may survive in two of the river's bendways, one in Lowndes County, Mississippi, and one in Pickens County, Alabama.

Curtus' mussel (*P. curtum*) is about 50 mm long, 35 mm high, and 30 mm wide with a green to greenish-brown, subtriangular shell and a thin bluish-white, iridescent nacre (also known as mother-of-pearl). Historically found in the main stem of the Tombigbee, the only currently viable habitat remains in the East Fork-Tombigbee in Mississippi. A few individuals may remain in a bendway of the Tombigbee in Pickens County, Alabama.

Similar in size to Curtus' mussel, the **Judge Tait's mussel (*P. taitlanum*)** is brown to brownish-black, obliquely triangular, and inflated. This clam was historically found in the Tombigbee River from Tibbee Creek near Columbus, Mississippi, to Demopolis, Alabama, and from parts of the Alabama, Cahaba, and Coosa Rivers, all in Alabama. Only four suitable sites remain: a bendway of the Tombigbee River in Sumter County, Alabama; the East Fork-Tombigbee in Mississippi; the Buttahatchie River in Mississippi; and the Sipsey River in Pickens and Green Counties, Alabama.

Historically found in the Tombigbee from Tibbee Creek downstream to Epes, Alabama, and the Black Warrior and Alabama Rivers, the **stirrup shell (*Quadrula stapes*)** is about 55 mm long, 50 mm high, and 30 mm wide. The shell is yellowish green with green, zigzag markings that become brown as the species matures. Only two small areas of suitable habitat remain, one in the Sipsey River and the other in a bendway of the Tombigbee. Two additional bendways of the Tombigbee may support a few specimens.



The Sipsey River in Alabama in one of the few rivers that provides suitable habitat for the Judge Tait's and stirrup shell mussels.

The **penitent mussel (*Epioblasma penita*)** is 55 mm long, 40 mm high, and 34 mm wide, has a yellowish, greenish-yellow, or tawny shell, and a radially sculptured posterior. The species was historically known from the Tombigbee, Alabama, Cahaba, and Coosa Rivers, but now remains only in the Buttahatchie River, the East Fork Tombigbee, and a single locality in a bendway of the Tombigbee in Pickens County.

All five clams have greatly declined in range and/or numbers because of the alteration of their free-flowing riverine habitat to an impounded river system by

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photo by Jim Williams

Five Clams

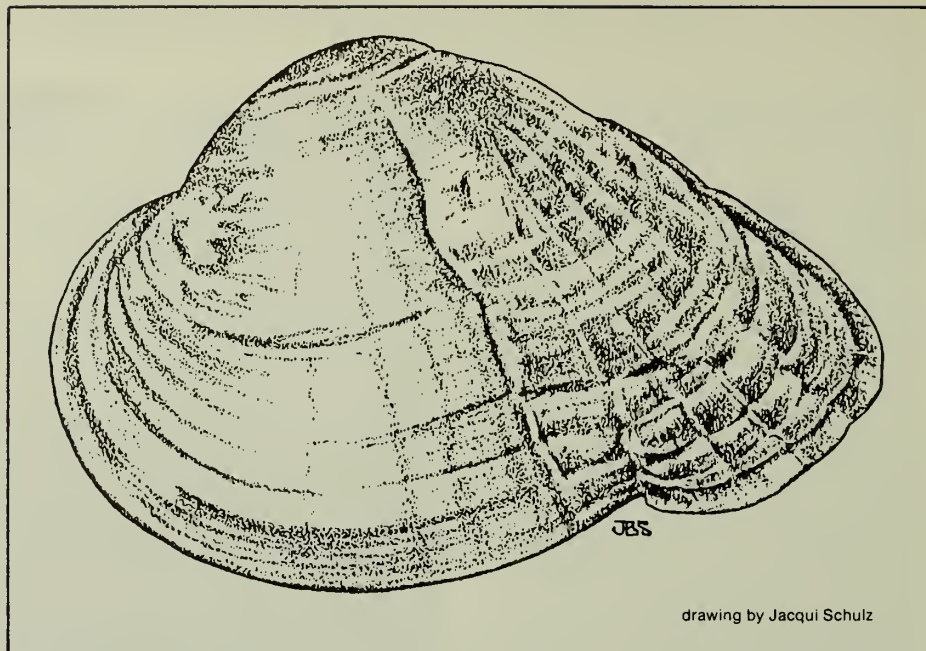
(continued from page 3)

the construction of the Tennessee-Tombigbee Waterway (TTW). The modification of the river to a series of impoundments adversely impacted these species by physical destruction during dredging, increased siltation, reducing water flow, and suffocating juveniles with sediment. They now survive only in areas that were bypassed by the TTW and in lower portions of some of the larger tributaries. Dredging and snagging for flood control threaten these remaining populations.

Low population numbers and a limited range increase the vulnerability of these rare clams to collecting, both for private collections and scientific purposes. The isolation of these species' remaining populations by the TTW also poses reproduction problems, resulting in reduced fertility. Isolation and low population density decreases the likelihood of successful reproduction since these species depend upon water currents for fertilization. Because these clams feed by filtering water, they are also affected by runoff of fertilizers, pesticides, and other pollutants.

All five species may also be adversely affected by loss of their fish hosts, certain species of fish to which mussels in early stages of development attach themselves for dispersal. Although the host fish for these particular species have not been identified, the hosts of clams from riffle habitats tend to be riffle-dwelling species that are also likely to decline or become extirpated as the habitat is modified.

Designations of Critical Habitat for the five Tombigbee mussels were found to be imprudent and of no additional benefit in this case. Federal regulations for alterations of the mollusks' habitats are primarily the responsibility of the U.S. Army Corps of Engineers (COE), and that agency is aware of the location



penitent mussel

drawing by Jacqui Schulz

of the remaining populations of the five species. In addition, the threat from taking of these rare species could increase with the required publication of Critical Habitat maps that accompany such a designation.

Benefits of Listing

If the proposal to list these five clams is approved, they will receive all the benefits and protection authorized by the Endangered Species Act. These measures include recognition of their precarious status, possible Federal funding to State programs for their conservation, the development of plans for their recovery, and prohibitions against certain practices.

Although a formal Critical Habitat designation is not being proposed at this time, Section 7 of the Act requires Federal agencies to ensure that any actions they authorize, fund, or carry out are not

likely to jeopardize the survival of any listed species. Federal activities that could be affected by this proposed listing include COE projects for flood control and navigation, and Soil Conservation Service (Department of Agriculture) watershed projects on Tombigbee River tributaries. If this proposed rule is made final, Federal agencies would be required to consult with the FWS on any of their activities that may affect the species. However, it has been the experience of the FWS that nearly all Section 7 interagency consultations are resolved so that the species are conserved while project objectives are met.

Comments on this listing proposal are welcome and should be sent by June 6, 1986, to the Endangered Species Field Supervisor, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

Three Species Given Federal Protection

The following species were recently added to the U.S. List of Endangered and Threatened Wildlife and Plants:

Tumamoca macdougallii (Tumamoc Globe-berry)

On April 29, 1986, the FWS published a final rule in the *Federal Register* to list the Tumamoc globe-berry as Endangered. First collected in 1908 on Tumamoc Hill, west of Tucson, Arizona, this monotypic species is a delicate perennial vine belonging to the gourd family (Cucurbitaceae). It grows from a tuber-

ous root, has herbaceous stems, and bears small, yellow flowers that produce tiny, red, watermelon-like fruits.

Historically, *T. macdougallii* was found at 16 widely scattered locations from Pima County, Arizona, to northern Sonora, Mexico. Much of this former range is being modified by agricultural and urban development. Today, there are 30 known U.S. populations containing approximately 433 adult plants and 1,867 juveniles; in Mexico, about 60 plants remain. Although the juvenile individuals are significant to the total population number, *T. macdougallii* has a high rate of seedling mortality.

Seventy-five percent of the entire population of this species in the U.S. is located on non-Federal land (city, county, State, and privately owned), and there is a good possibility that modification of the globe-berry's habitat could occur, resulting in destruction or damage to the plants. In addition, the State of Arizona is trying to secure parcels of BLM-administered land in the Avra Valley, some of which contain populations of *T. macdougallii*. If this land is transferred to State jurisdiction, it is expected to undergo development. Other threats to the species include the proposed construc-

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tion route of the Central Arizona Project aqueduct (a Bureau of Reclamation (BR) water diversion project), grazing, and collecting. The FWS will work with the BR to minimize impacts to *T. macdougallii* from the aqueduct.

***Hibiscadelphus distans* (Kaua'i Hau Kuahiwi)**

Also listed as Endangered in April (F.R. 4/29/86), *Hibiscadelphus distans* is a small tree that grows up to 18 feet (5.5 meters) tall. This member of the mallow family (Malvaceae) has green, heart-shaped leaves, smooth bark, and greenish-yellow flowers that turn maroon with age. Only 10 individuals of this rare Hawaiian species remain in the wild, located in the State-owned Pu'u Ka Pele Forest Reserve on the island of Kaua'i. The plants live within an area of approximately 220 square yards (185 square meters) on a steep rock bluff.

Although only discovered in 1972, *H. distans* was probably more abundant and more widely distributed at one time, but browsing by a large feral goat population, maintained by the State for hunting, led to the species' decline. These goats still pose a threat to the remaining plants, along with competition with other exotic species, disturbance from hikers, collecting, and vandalism. Removal of or damage to any of the few remaining individuals could seriously jeopardize this species' chances for survival. Although *H. distans* is found within a State forest preserve where regulations prohibit the removal or destruction of the plants, these regulations are difficult to enforce. The Endangered Species Act will now provide additional protection.

***Gila ditaenia* (Sonora Chub)**

This fish, a member of the minnow family, generally is less than 5 inches (125 millimeters) in total length, moderately chubby, and dark-colored. It is primarily a pool dweller, but not much more is known about its behavior and habitat preferences. Because of the threats to its existence by the introduction of exotic fishes into its habitat and by potential mining activities, the FWS listed the Sonora chub as Threatened on April 30.

The Sonora chub is located in Santa Cruz County, Arizona, and in Sonora, Mexico. The U.S. population occurs in the Coronado National Forest's Yank's Spring, Sycamore Creek, and in two of its tributaries: Penasco Creek and an unnamed stream. During years of heavy rainfall, water reaches to the International Border, some 5 miles (8 km) downstream from Yank's Spring, at which time the Sonora chub extends its range to that boundary. In Mexico, this species is known from very few localities and its biological status there is uncertain. Such

a limited distribution makes the Sonora chub very susceptible to any habitat disturbances, especially during periods of intermittent stream flow. Increased siltation and runoff subsequent to mining or other activities, depletion of stream flow, and the introduction of manmade pollutants into the stream could quite possibly extirpate the species throughout its U.S. range in a relatively short time.

As part of the final rule, Critical Habitat was designated for the Sonora chub to include the entire area in the U.S. where the species is known to occur, as well as a 25-foot (7.6 m) wide riparian zone along each side of the streams. This Critical Habitat area is under the jurisdiction of the U.S. Forest Service, whose management is currently compatible with the designation.

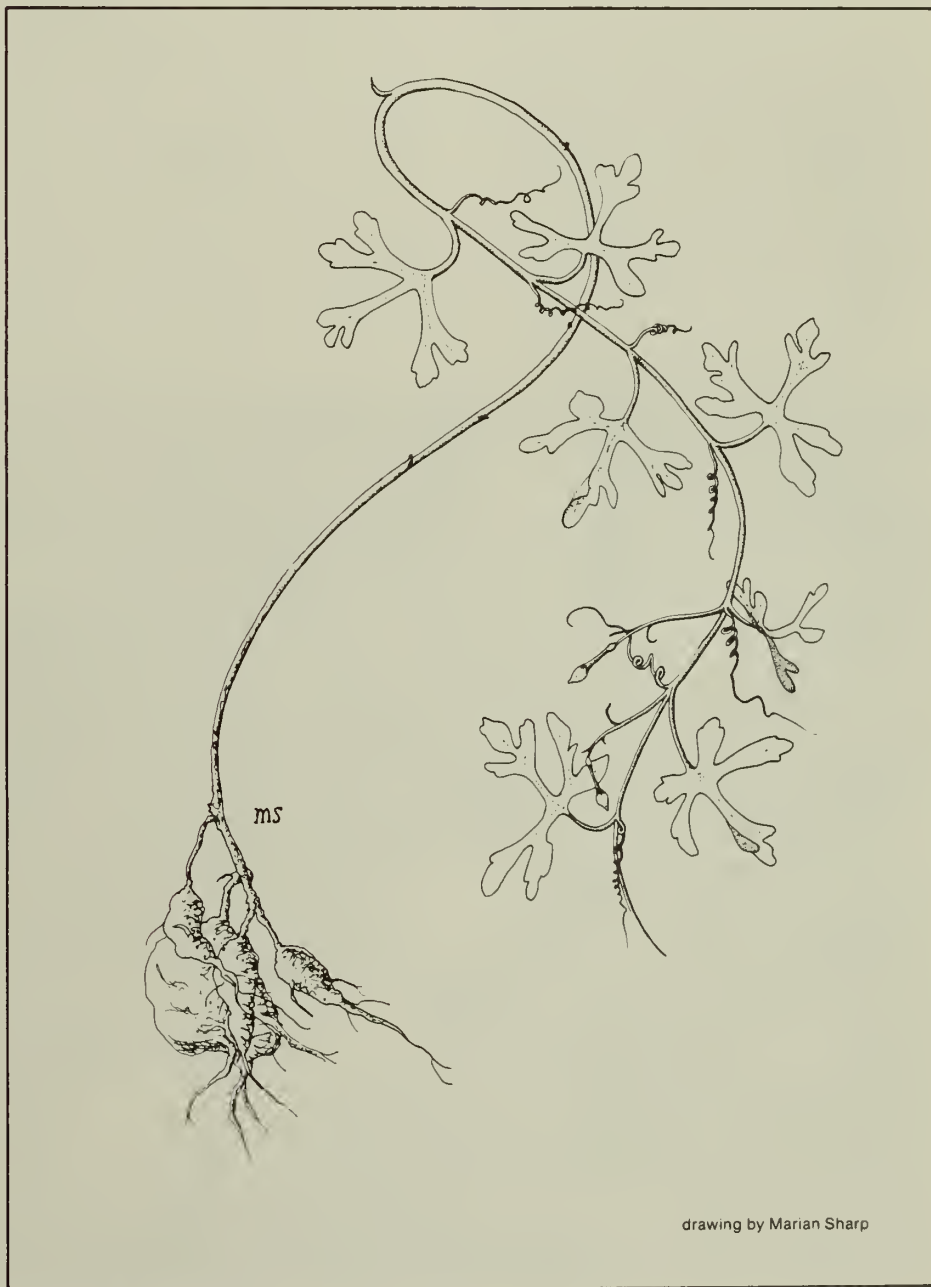
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Available Conservation Measures

Each of these three species now receives the full protection authorized by the Endangered Species Act. Conservation measures available under the Act include a requirement for the FWS to develop and implement a recovery plan for each species, possible Federal funding for State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of any listed species or adversely modify its Critical Habitat. Although the Sonora chub and the Tumamoc globe-berry are

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drawing by Marian Sharp

Tumamoca macdougallii

Three Plants

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located within federally-administered lands, the Federal agencies involved (U.S. Forest Service, Bureau of Indian Affairs, Bureau of Land Management, and Bureau of Reclamation) are aware of the species' presence on their lands and are actively planning their activities to minimize adverse effects to these newly listed species. These Section 7 provisions apply to all listed species even though Critical Habitat is not always formally designated.

Interstate and international trafficking in listed species without a permit is also prohibited, with certain exceptions. Due to the numerous threats to *Hibiscadelphus distans* and its depleted state in the wild, it may be necessary to propagate the species in nurseries; permits could be obtained under such circumstances. Several specimens are in cultivation, and seeds have been sent to Texas A & M University.

Under Section 9, the take of listed animals without a Federal permit is generally prohibited, but since the Sonora

chub is threatened primarily by habitat disturbance or alteration rather than direct taking, a special rule allowing take for special purposes was issued as part of the final rule for the chub. Take may occur for educational, scientific, and other conservation purposes compatible with the Endangered Species Act without the need for a Federal permit, if a State collection permit is obtained and all other State wildlife conservation laws are satisfied. For listed plants, the rule on take is different; it is a violation of the Act to remove Endangered plants only from lands under Federal jurisdiction.

Eighteen Plants

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Lake Wales Ridge in Polk County, nine are in Highlands County, and the rest are in Lake and Osceola Counties. Only the plants in Highlands Hammock State Park are currently protected from habitat loss.

● ***Erynglum cuneifolium* (snakeroot)**—

A member of the parsley family (Apiaceae), this species is an erect perennial herb with a long, woody taproot. There usually are several branching stems reaching up to 1.5 feet (0.5 m) in height. The species' small flowers, which turn gradually from greenish-white to powder blue, appear from August to October. *E. cuneifolium* has a narrow geographical distribution of 11 known localities in Highlands County, one in Putnam County, and another in Collier County. Only the colonies on Archbold Biological Station, a privately owned facility in Highlands County, receive protection from habitat destruction.

● ***Hypericum cumulicola* (Highlands scrub hypericum)**—

This wiry perennial, a member of the St. John's-wort family (Hypericaceae), sends out several erect stems about 2 feet (0.6 m) tall from a taproot. The stems bear widely spaced pairs of small, needle-like leaves. Numerous small, bright yellow flowers begin to appear in June. *H. cumulicola* is known historically from 36 sites, but its presence is now confirmed at only 11 in southern Highlands County. All but three of these localities, those on the Archbold Station and on The Nature Conservancy's (TNC) Lake Arbuckle preserve, are vulnerable to development.

● ***Paronychia chartacea* (papery whitlow-wort)**—

This small annual in the pink family (Caryophyllaceae) forms bright green, low growing mats of vegetation up to 4 inches (10 centimeters) thick, radiating from a taproot. Among its distinguishing features are its stems that fork repeatedly from the base, its tiny scale-like



drawing by Anna-Lisa King

Erynglum cuneifolium

leaves, and the numerous small white flowers. *P. chartacea* has a somewhat larger geographical range than the other recently proposed Florida scrub plants, and is known from 46 sites, some of which are on the Archbold Station and the Lake Arbuckle preserve.

● ***Polygonella basiramia* (wireweed)**—

Another taprooted annual, this member of the buckwheat family (Polygonaceae) forms clusters of 7 to more than 30 erect, slender branches that reach a height of approximately 2.5 feet (0.8 m) and bear small, hairlike leaves. *P. basiramia* is conspicuous only in fall when the short clusters of small white flowers appear. Some protected sites exist on the Archbold Station and on Highlands Hammock State Park, but the total number of localities is small, only 21.

● ***Warea carteri* (Carter's mustard)**—

This member of the mustard family (Brassicaceae) is an unbranched annual up to 3 feet (1 m) tall. Its simple, alternate leaves gradually diminish in size upward along the stem until they become small bracts near the apex. The stem is topped by a raceme of white flowers. Historically, *W. carteri* was reported from Dade, Brevard, Polk, Highlands, and (possibly) Liberty Counties, but recent surveys indicate that it survives at only a single site on the Archbold Station.

All of the above species are proposed for listing as Endangered, with the exception of *Paronychia chartacea*. Because this species occurs at more sites than the others and is not in imminent danger of extinction, although its habitat is vulnerable, *P. chartacea* has been proposed for listing as Threatened.

Sand pine scrub vegetation consists of sand pine (*Pinus clausa*) with shrubby evergreen oaks (*Quercus* spp.). It is restricted to Florida, where it is widespread, and to the Alabama Gulf Coast. This is one of the most distinctive natural communities of Florida, both on the coasts and on inland sand ridges, and it

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is the primary (sometimes only) habitat for a number of plants and animals, some of which are already listed or are candidates for listing.

The main threat to the Florida scrub plants is the widespread loss of habitat. Many interior areas have been converted from sand pine scrub to citrus groves. Florida has a very rapidly expanding human population, and residential developments also are replacing large areas of natural habitat. Many of the remaining stands of scrub are only small, isolated fragments.

Conservation of the sand pine scrub plant community requires periodic disturbance. The recently proposed plants grow only on patches of bare sand within the scrub areas. Scrub burns infrequently, roughly every 30 to 80 years, but the fires can be intense. Most of the shrubs renew themselves from root sprouts, although sand pine and rosemary (*Ceratiola ericoides*) reoccupy burned areas only by seed. Occasional fires or brush removal are needed to maintain the otherwise ephemeral open habitat. Total suppression of wildfires, therefore, can modify the habitat by allowing brushy encroachment.

Several of the newly proposed Florida scrub plants grow on lands managed for conservation purposes, but these areas do not contain all of the endemic scrub species and may not have sufficient

populations of the proposed species to ensure their survival. The Archbold Biological Station expects to employ prescribed burning as a habitat management technique, and TNC may follow suit. Listing the Florida scrub plants could encourage vegetation management in other areas as well.

All currently known sites for the recently proposed scrub-endemic plants are on private or State-owned lands not affected by Federal activities, with a few exceptions. For example, some of the plants that occur on State highway rights-of-way may be subject to Federal involvement if the Federal Highway Administration provides funds for road maintenance and construction. If the scrub plants are listed and Federal agencies determine that their actions may affect any of the species, the agencies involved will be required to consult with the FWS.

Comments on the April 24, 1986, proposal to list the scrub lupine are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Jacksonville Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207 by June 23, 1986. Comments on the April 10 proposal to list seven other Florida scrub plants are due June 9, 1986, at the same address.

Two Puerto Rico Plants

Peperomia wheeleri (Wheeler's peperomia), a fleshy evergreen herb in the pepper family (Piperaceae), was proposed for listing as Endangered on April 10. This species grows to about 3 feet (1 m) in height and bears clusters of minute flowers in spikes 4 to 6 inches (10 to 15 cm) long. It is restricted to an area of semievergreen, open forests on large boulders on the north slopes of Monte Resaca on Culebra Island, part of the Commonwealth of Puerto Rico. Although the boulder substrate extends over much of the north side of Culebra Island, deforestation and livestock grazing have eliminated or substantially altered the native vegetation, thus removing *P. wheeleri* from most of its former range. Within the remaining forested areas, foraging by escaped domestic fowl is destroying the layer of humus overlying the boulders that is needed by the plant.

Almost all of the surviving *P. wheeleri* populations are located within the 375-acre (152-hectare) Monte Resaca Unit of Culebra National Wildlife Refuge. Measures are being taken on the refuge to exclude livestock; however, until this work is complete and a habitat management plan for *P. wheeleri* is developed, some additional losses of plants and habitat are likely.

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photo by Deborah Mignogno

Peperomia wheeleri

Banara vanderbiltii (Palo de Ramon), another Puerto Rico plant proposed for listing as Endangered on April 10, belongs to the flacourtia family (Flacourtiaceae). This evergreen tree can reach up to 30 feet (10 m) in height. The species currently survives at a single locality in the semievergreen forests of the karst region of northern Puerto Rico.

B. vanderbiltii was discovered in 1899 and the first specimens were collected at sites near what is now the greater San Juan metropolitan area; however, the species is now extirpated there due to deforestation. In the 1950's, two trees were discovered in the limestone hills west of the town of Bayamón but they subsequently were destroyed when the area was cleared to plant yams. The species was believed to be extinct until further investigations in the same general region resulted in the discovery of five young plants; a sixth plant also was found recently. These plants occupy a privately-owned site of less than 165 square feet (16 square m) that is less than 660 feet (200 m) from a major highway. Further clearing, modification of the forest edge, or encroachment by exotic plant species could result in the extinction of *B. vanderbiltii*.

Comments on the proposals to list *P. wheeleri* and *B. vanderbiltii* as Endangered are welcome, and should be sent to the Field Supervisor, Caribbean Field Office, U.S. Fish and Wildlife Service, P.O. Box 491, Boquerón, Puerto Rico 00622 by June 9, 1986.

Two California Plants

Two plant taxa endemic to small areas of southern California were proposed for listing as Endangered on April 9. The first, *Eriastrum densifolium* ssp. *sanctorum* (Santa Ana River woolly-star), is a shrub in the phlox family (Polemoniaceae) that occasionally grows 3.3 feet (1 m) tall. Its stems and leaves are gray-green in color, and the bright blue flowers are contained in heads of about 20 blossoms each. This subspecies once occurred on the higher floodplain terraces of the Santa Ana River and its tributaries in Orange, Riverside, and San Bernardino Counties, where it was a conspicuous part of the alluvial fan scrub vegetation.

All of the plant's Orange County habitat has been replaced by urbanization, citrus groves, horse stables, and urban parks. In Riverside County, the former sites now contain residential developments, ranches and croplands, and sand and gravel mines. The plant survives only in isolated stands in San Bernardino County along the Santa Ana River, and at a disjunct colony along Lytle Creek. Only remnants of habitat remain; where the river has been channelized,



Eriastrum densifolium ssp. *sanctorum*

urban and agricultural developments have spread down to the river's edge.

Centrostegia leptoceras (slender-horned spineflower) has declined for similar reasons. This small prostrate annual in the buckwheat family formerly was more widespread, occurring on old sandy benches or floodplain terraces containing alluvial fan scrub habitat in Los Angeles, Riverside, and San Bernardino Counties. Currently, however, it is known to exist at only 4 localities total-

ling less than 10 acres (4 hectares) within Riverside and San Bernardino Counties. The colonies are found along the Santa Ana River, Lytle Creek, San Jacinto River, and Temescal Creek.

In addition to habitat loss, this low-growing plant is threatened by the spread of taller, weedy exotic annuals that block the full sun it needs. All known *C. leptoceras* sites are near areas dominated by such introduced plants.

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The remaining stands of *E. d. ssp. sanctorum* and *C. leptoceras* in San Bernardino County are threatened by proposed sand and gravel mines on private and Bureau of Land Management (BLM) lands. Flood-control dams proposed by the U.S. Army Corps of Engineers (COE) in the upper Santa Ana River Canyon and Lytle Creek could indirectly affect the plants if the projects result in the relaxation of zoning restrictions that now limit development in the flood plain. Increased urbanization of the flood plain could lead to extinction of *E. d. ssp. sanctorum* and extirpation of *C. leptoceras* from San Bernardino County. The San Jacinto River and Temescal Creek drainages are also experiencing urban and agricultural development.

The populations of these plants that occur on Federal lands are within the BLM's Metropolitan Project Area of Southern California. BLM is transferring its holdings in this project area to other Federal and private agencies. Some of the habitat conservation benefits available under the Endangered Species Act would be lost if the sites pass from Federal jurisdiction. If the taxa do become listed, the COE, BLM, and any other Federal agency whose activities may affect the plants would be required to consult with the FWS. Further, it would become illegal to collect these plants on lands under Federal jurisdiction except under Federal permit.

Comments on the listing proposal are welcome, and should be sent to the Chief, Division of Endangered Species, U.S. Fish and Wildlife Service, Region 1 (address on page 2 of the BULLETIN), by June 9, 1986.

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Geocarpon minimum

G. minimum, the only member of its genus, is a small, succulent annual in the pink family that grows only up to 1.6 inches (4.0 cm) in height. It is ephemeral, usually completing its life cycle within a 4-week period. The plants are a dull gray when young and turn reddish-purple at maturity.

Extensive field surveys of suitable habitat have resulted in the location of only 13 surviving *G. minimum* populations in Missouri and 3 in Arkansas. In Missouri, the species grows on moist, sandy soils of exposed sandstone outcrops primarily of the Channel sands formation. Arkansas sites are sandy-clay prairies within otherwise savanna-type areas that have bare mineral soils of the Laje Series (high in sodium and magnesium) and that may represent relict Pleistocene lake beds. Species diversity is low in both of these communities.

Of the Missouri sites, there are five in Dade County, two each in Polk, St. Clair,

and Cedar Counties, and one each in Lawrence and Greene Counties; however, only 4 support vigorous populations. In Arkansas, there is a large population at Warren Prairie (in parts of Bradley and Drew Counties) and two small depauperate sites at Kingsley Prairie (Cleveland County). Most of the *G. minimum* sites are on privately-owned lands, although two are on areas administered by the COE, one is on land owned by the State of Missouri (Missouri Department of Conservation), and a portion of another belongs to the State of Arkansas (Arkansas Natural Heritage Commission).

Many of the Missouri sites have been damaged from trampling and grazing by cattle; in fact, grazing is probably responsible for the species' extirpation at its type locality. *G. minimum* habitat continues to be damaged by off-road vehicles (ORVs). Suitable habitat is limited, and most such areas have been heavily damaged.

In Arkansas, many of the sites have been damaged by silvicultural practices. Even though the habitat is of low agricultural quality, some areas also have been cultivated in the past or converted to pasture. *G. minimum* populations near roads may be further threatened by future road expansions and improvements.

Overcrowding and shading from other vegetation constitutes an additional threat to *G. minimum*. It is a pioneer species that tolerates little competition and seems to require some type of natural disturbance of the habitat in order to maintain bare substrate for seedling establishment.

Although *G. minimum* is not in imminent danger of extinction, it is rare and vulnerable, and the FWS proposed on April 10 to list it under the Federal Endangered Species Act as Threatened. It is already listed under Missouri law as endangered, a State classification that prohibits commercial exploitation of the plant without a permit but does not protect against habitat loss on private lands, which is the main threat to *G. minimum*.

Two of the *G. minimum* sites in Dade County are on lands administered by a Federal agency, the COE; however, there are no known current or planned Federal activities that may affect the species. Both populations on federally administered lands will receive Endangered Species Act protection from collectors if *G. minimum* is listed.

Comments on the proposal to list this plant as Threatened are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish & Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by June 9, 1986.

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Lysimachia asperulaefolia (Rough-leaved Loosestrife)

The slender stems of this perennial herb in the primrose family (Primulaceae) grow from a rhizome and can reach heights of up to 2 feet (60 cm), although it typically grows only to about half that size. Whorls of usually three to four leaves encircle the stem at intervals below the plant's showy yellow flowers. *L. asperulaefolia* was reported historically from 2 sites in South Carolina and 17 in North Carolina, but widespread modification and loss of habitat apparently has eliminated the species from South Carolina. It is known to survive

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Lysimachia asperulaefolia

photo by Kerry T. Givens

only at nine sites in North Carolina. Because the remaining populations are vulnerable, the species was proposed for listing as Endangered on April 10.

L. asperulaefolia is endemic to the coastal plain and sandhill regions of the Carolinas. It generally occurs in the ecotones or edges between longleaf pine uplands, savannas, and pond pine pocosins (areas of dense shrub and vine growth, usually on peaty, poorly drained soil). These ecotones are maintained by periodic wildfires, as are the adjacent plant communities. Some of the historical habitat has been greatly modified by fire suppression, which results in the uncontrolled growth of competing shrubby species, eliminating the open edges required by the shade-intolerant *L. asperulaefolia*. Drainage of the moist habitat for conversion to pine plantations or other silvicultural operations also has directly eliminated several populations of the species. To a lesser extent, residential and industrial developments have contributed to the loss of habitat.

Two of the remaining populations of *L. asperulaefolia* are in Carteret County. Both are on lands administered by the U.S. Forest Service (Croatan National Forest); however, one is partially on private land. The largest population is composed of several colonies, two of which have declined and are threatened by continuing draining and other activities related to silviculture on adjacent areas. Another two populations are in Scotland County on Department of Defense (DOD) property that is leased and managed by the North Carolina Wildlife Resources Commission as part of the Sandhills Gamelands. Both are threatened by shrub encroachment due to fire suppression. Of Brunswick County's two *L. asperulaefolia* populations, one is vigorously responding to habitat management by prescribed fires on TNC property. The other, on the DOD Sunny Point Military Ocean Terminal, also has benefited from a recently initiated program of prescribed burning, but nearby drainage of pocosins could affect the hydrology of the site.

A population consisting of two small colonies, which cover a combined area of less than 7.2 square yards (6.0 sq. m) is located on the border of Cumberland and Bladen Counties. One of the colonies is on land owned by the North Carolina Department of Natural Resources and Community Development, and the other is on private property. Both colonies are threatened by fire suppression. In Pender County, an *L. asperulaefolia* population occurs on land owned in part by TNC and the North Carolina Wildlife Resources Commission; a small portion of the tract also is privately owned. This population is small and feeble due to severe brush

encroachment. The ninth surviving population is in Hoke County on Fort Bragg Military Reservation. Although still relatively vigorous, this population is vulnerable to fire suppression or a long-rotation burning schedule, timber harvesting, and (possibly) mechanized military training exercises in the fragile pocosins.

L. asperulaefolia is listed by the State of North Carolina as endangered under its own legislation, which provides for controls on taking and intrastate trade but does not cover adverse habitat modifications. Because most of the remaining populations are at least partially on lands under Federal, State, or TNC ownership, listing the species as Endangered under the Federal Endangered Species Act would encourage the continued use of prescribed burning and other appropriate habitat management techniques. Additionally, it would become illegal to collect plants on Federal lands without a Federal permit.

The U.S. Forest Service and the DOD are the two Federal agencies that have direct jurisdiction over portions of *L. asperulaefolia* habitat. Their potential activities that could affect the species and its habitat in the future include, but are not limited to: timber harvesting and conversion of population sites to pine plantations by means of drainage and mechanical site preparation; mechanized military training activities; recreational developments; drainage operations; road construction; and permits for mineral exploration. No major conflicts are foreseen, however, and the FWS will work with the involved agencies to secure the species' conservation while accommodating agency objectives to the extent possible.

Comments on the proposal to list *L. asperulaefolia* as Endangered are welcome, and should be sent to the Field Supervisor, Asheville Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by June 9, 1986.

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***Lesquerella pallida* (White Bladderpod)**

An erect to spreading annual in the mustard family, *L. pallida* individuals range from 2.0 to 23.6 inches (5 to 60 cm) tall. The white flowers are arranged in racemes up to 6.3 inches (16 cm) long and containing up to 24 blossoms. This species occurs near the city of San Augustine in the gently rolling coastal plain of eastern Texas. Only three small populations are known, and all are vulnerable to habitat disturbance. Accordingly, *L. pallida* was proposed on April 9 for listing as Endangered.

This species is found in open areas associated with rock outcrops of the

Weches formation, which usually consists of calcareous marine sediments underlain by a grayish-green layer of glauconite. Because of the impermeability of the glauconite layer, Weches outcrops are wet much of the year. Soils around the outcrops are basic in pH due to the high levels of calcium and magnesium in the rocks, in sharp contrast to the acidic, leached soils usually encountered in eastern Texas.

The largest of the three known *L. pallida* populations was discovered in 1981 on privately owned land used for pasture. It covers approximately 5 acres (2 hectares) and, in 1985, probably numbered 3,300 or more individual plants. Both of the other existing populations were found in 1985. One numbers about 50 plants and is confined to a single opening of about 13 by 49 feet (4 by 15 m) on private land near an area used partially as a garbage dump. This site also is being invaded by Macartney rose (*Rosa bracteata*) and other shrubs and trees. The third population is located on a county road right-of-way and an adjacent pasture. It measures approximately 98 by 246 feet (30 by 75 m) in size and contains about 160 plants. Brush encroachment is occurring at this site as well.

Herbicide spraying for brush control in pastures is a common practice in the region. Inadvertent application of herbicides to *L. pallida* could destroy the two smaller populations and seriously reduce the largest one. Although the pastures where the plants occur are now only moderately grazed, future changes in ownership or management could increase the chances that *L. pallida* populations could be seriously damaged by trampling and overgrazing. In addition, the population on the county road right-of-way could be damaged by road widening or roadside maintenance, including spraying.

Comments on the proposal to list *L. pallida* as Endangered are welcome, and should be sent to the Regional Director, Region 2 (address on BULLETIN page 2), by June 9, 1986.

***Lesquerella filiformis* (Missouri Bladder-pod)**

Another annual in the mustard family, *L. filiformis* grows erect, hairy stems that branch from the base and reach a height of approximately 8 inches (20 cm). The basal and stem leaves also are hairy on both sides, giving them the gray-silvery appearance that distinguishes this species from the only other *Lesquerella* in Missouri, the introduced *L. gracilis* var. *gracilis*. *L. filiformis* has light yellow flowers that usually appear at the tops of the stems in late April to early May.

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L. filiformis is endemic to the unglaciated prairie area of southwestern Missouri at nine sites within Greene, Dade, and Christian Counties. The sites are in open glades where soils are shallow and the underlying limestone bedrock approaches or reaches the ground surface. Although *L. filiformis* is not known to have been more widespread historically than it is today, the species' low numbers and limited distribution make it vulnerable to collecting and habitat disturbance. A proposal to list the plant as Endangered was published on April 7.

Two of the nine known populations are within the Wilson's Creek National Battlefield, a unit of the National Park Service, in Christian and Greene Counties. A system of interpretive trails extends through the *L. filiformis* sites, and research is needed to determine proper habitat management in the face of an anticipated rise in future visitor levels. Three populations occur on State highway rights-of-way; two of these also extend onto adjacent private lands. Cooperation with the Missouri Department of Transportation is necessary to protect the plants from the effects of mowing or herbicides. The remaining four populations are on private property and could be vulnerable to future land use changes.

Missouri already lists *L. filiformis* under its own legislation as endangered. State regulations prohibit exportation or sale of the species, and prohibit its collection without landowner permission. Prohibitions against collecting will be reinforced for those populations on the national battlefield if *L. filiformis* is listed under the Federal Endangered Species Act.

Comments on the listing proposal are welcome, and should be sent to the Endangered Species Coordinator, U.S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111 by June 6, 1986.

***Eriogonum humilvagans* (Spreading Wild-buckwheat)**

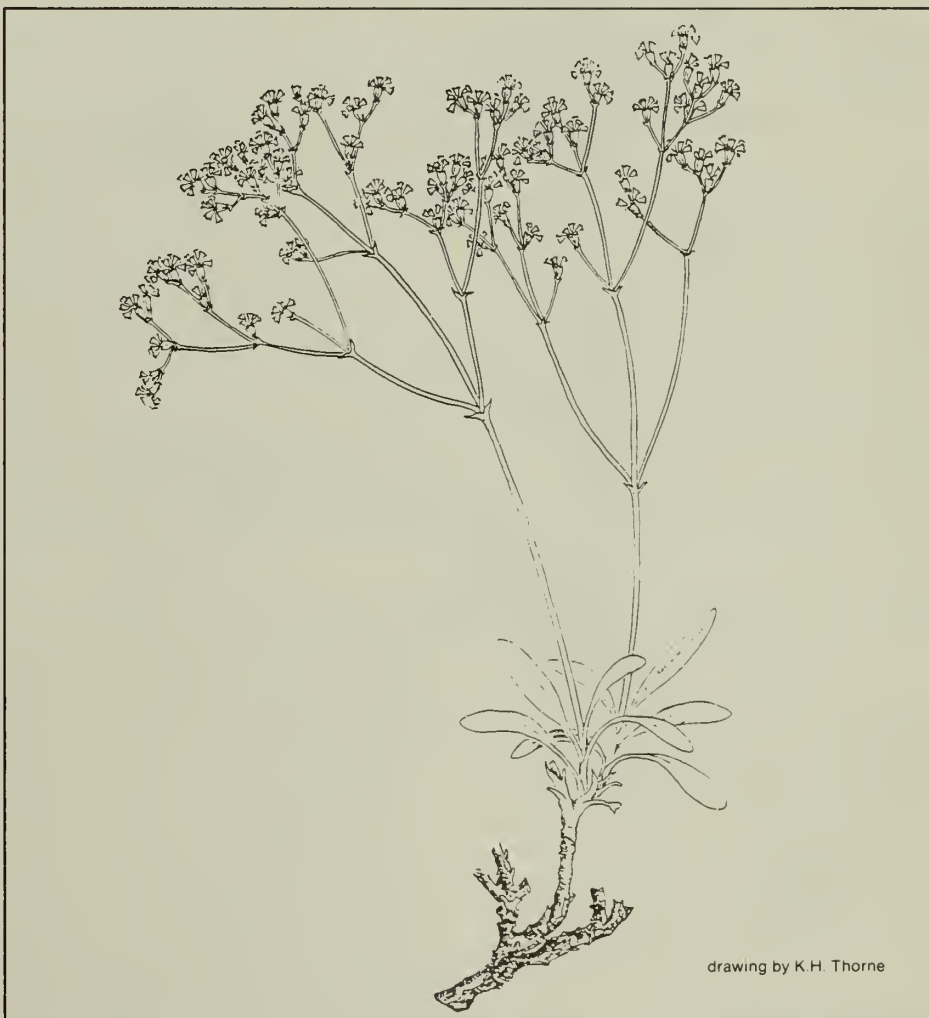
This low-growing perennial in the buckwheat family reaches 8 to 12 inches (20 to 30 cm) high and spreads 12 to 16 inches (30 to 40 cm) across. The narrow, strictly basal leaves are densely hairy below and mostly green above. *E. humilvagans* produces branched, spreading inflorescences that bear clusters of tiny white flowers. There is only one extended population, which is broken up into six localized occurrences over a distance of about 10 miles (16 kilometers) in San Juan County, Utah. Much of the species' historical habitat has been lost to agriculture, and some of its remaining range

(continued on next page)



Lesquerella filiformis

photo by Sherry Morgan, Missouri Department of Conservation



drawing by K.H. Thorne

Eriogonum humilvagans

is over land leased for possible mining or drilling. Because of its decline and uncertain future, *E. humivagans* was proposed on April 7 for listing as Endangered.

The sub-populations range in size from 100 to 3,000 plants, with a total of approximately 5,000 plants known. They occur on remnant heavy clay soils of the Mancos shale formation in an area of pinyon-juniper woodlands and sagebrush parks. Many of these areas have been cleared and put under nonirrigated, dryland cultivation. Only one *E. humivagans* site is in an undisturbed area. Most of the others occur as small remnants along the edges of cleared fields, sometimes on opposite sides, implying the nearly total loss of larger continuous occurrences. The species' type locality has been bisected by a State highway, and the remaining individuals in the right-of-way could be affected by further con-

struction and certain roadside maintenance practices.

Because the underlying geological formation may contain uranium, gas, or oil, further losses of habitat could result from activities relating to mining or drilling. Several of the *E. humivagans* sites are covered by mining claims and oil or gas leases. Some of the leases have been allowed to expire by one company and then were picked up by another, which indicates low commercial potential. Impacts to the plants are more likely to result from surface disturbance associated with exploration and the annual assessment work that is required to maintain title to the claims.

All *E. humivagans* sites are on private or State lands, except for an isolated 160-acre (65 ha) BLM tract near Monticello. Transferring this habitat from Federal jurisdiction would result in the loss

of some Endangered Species Act benefits, including the prohibition against collecting the plant on Federal land. If the species is listed, BLM will be required to consider the impacts of land disposition as well as to exercise special care in administering leases and claims.

Comments on the listing proposal are welcome, and should be sent to the Endangered Species Staff, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104 by June 6, 1986.

***Penstemon haydenii* (Blowout Penstemon)**

A stout perennial herb in the snapdragon family (Scrophulariaceae), *P. haydenii* grows leafy stems one to two feet (30.5 to 61.0 cm) in height. Its attractive light-blue flowers are borne on a compact, cylindrical inflorescence, and have a strong, persistent fragrance. Historically, the species probably was widely scattered throughout the central sandhills of Nebraska; however, stabilization of its open sand dune habitat has reduced *P. haydenii* to small populations in Hooker, Cherry, and Garden Counties of 60, 230, and 660 individuals, respectively. Because its remaining limited range is vulnerable to modification, *P. haydenii* was proposed for listing as Endangered on April 29.

Blowouts themselves are interesting phenomena. These products of natural erosion are peculiar conical or irregular craters scooped out of the deep, loose sands of dune complexes by swirling wind action. *P. haydenii*, having adapted to the unusual environmental extremes of wind, temperature, evapotranspiration, and soil moisture characteristic of blowouts, is found only at such sites. *P. haydenii* can spread by rhizomes, surviving burial in accumulating sand by sending off shoots at progressively higher stem nodes. If the blowouts become stabilized and revegetated by other plants, *P. haydenii* cannot compete. In the past, new blowouts formed as others disappeared; however, widespread control of unstable dunes as a range-management practice has significantly reduced existing blowout habitat and the conditions that lead to their formation.

Approximately 75 percent of the known *P. haydenii* populations occur on the Valentine and Crescent Lake NWRs, managed by the FWS. If the species is listed, the individuals on these Federal lands will receive legal protection from collectors. The other 25 percent are on State and private lands.

Comments on the proposal to list *P. haydenii* as endangered are welcome, and should be sent to the Regional



drawing by Bellamy Parks

Penstemon haydenii

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Available Conservation Measures

If the listing proposals are later made final, these plants will receive the conservation benefits authorized for Endangered or Threatened plants under the Endangered Species Act. Such benefits include, but are not limited to, prohibitions on interstate or international trafficking in listed plants without a permit; a requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to States that

have approved Endangered Species Cooperative Agreements with the FWS for listed plants.

It was judged imprudent to propose designations of Critical Habitat for these plants. Publishing the maps and detailed habitat descriptions required for such designations could further threaten these species by making them more accessible to illegal collectors, who may find the plants desirable for their attractiveness or rarity. Nevertheless, if these species are listed, they and their habitat will receive protection under Section 7 of the Act, which requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeop-

ardize the survival of listed species. When a Federal agency finds that one of its actions may affect a listed species, that agency must consult with the FWS. With early planning and consultation, potential conflicts with project goals almost always can be avoided.

Section 9 of the Act makes it illegal to remove and reduce to possession Endangered or Threatened plants from lands under Federal jurisdiction. This complements any controls on taking that may exist under State law. Federal collecting permits are available for approved research or conservation purposes when consistent with applicable State and other Federal regulations.

Regional Briefs

(continued from page 2)

Team members were each assigned to review specific portions of the recently completed technical draft of the Yaqui Fishes Recovery Plan. A key component of the recovery of the Rio Yaqui species involves combining the master plan for the San Bernardino National Wildlife Refuge (NWR) with the Yaqui fishes recovery effort.

Potential recovery actions for the recently listed Sonora chub (*Gila ditaenia*) also were discussed. Discussions were held regarding the possible use of aquatic habitats on the Buenos Aires NWR as refuge and grow-out areas for certain desert fish species, including the desert pupfish (*Cyprinodon macularis*), bonytail chub (*Gila elegans*), Colorado squawfish (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), and Gila topminnow (*Poeciliopsis occidentalis*). Recent surveys on the refuge sampled 47 ponds and found only four introduced fish species (yellow and black bullhead, fathead minnow, and mosquitofish). After the meeting, the team visited selected Endangered fish habitats in Arizona, including Monkey Springs, Bog Hole, Sharp Spring, and San Bernardino NWR.

On April 3, a public hearing was held in Ballinger, Texas, concerning the listing of the Concho water snake (*Nerodia harteri paucimaculata*) as a Threatened species with Critical Habitat. (See story on proposed rule in BULLETIN Vol. XI No. 2.) Over 325 people attended the meeting, with the majority expressing concern about how the listing might affect the proposed Stacy Dam on the Colorado River. Numerous officials from cities in the area presented information about the need for water from Stacy Dam and the economic impact that might

result from a Critical Habitat designation. No new biological data were presented.

The FWS recently received status reports on two species of nectar-feeding bats, *Leptonycteris sanborni* and *L. nivalis*. Surveys of sites in the U.S. and Mexico indicate that both species have declined in recent years. For example, the population of *L. nivalis* in the Big Bend area of Texas, the only major U.S. roosting site for the species, was estimated to contain 10,650 bats in 1967. Only 1,000 bats were estimated to exist in 1983. The major U.S. roosting colony for *L. sanborni* is on private land in Santa Cruz County, Arizona. Until the 1950's, a roosting colony for this bat contained as many as 20,000 females; that colony no longer exists.

U.S. and Mexican populations of these species migrate south in the fall. Their survival is threatened by disturbances of roost sites, loss of food sources (flowers of certain agave and cacti), and killing by humans. Both species are currently considered Category 2 candidates for future listing proposals.

There are 16 active bald eagle (*Haliaeetus leucocephalus*) nests in Arizona this year. Eleven of those nests are still viable, and up to 16 young may fledge this spring. In March, one nest with two 10-day-old chicks was jeopardized by rising water levels in Horseshoe Reservoir. The chicks were rescued by personnel from the FWS, Bureau of Reclamation, and Salt River Project and taken to the Phoenix Zoo. The zoo personnel cared for the chicks using bald eagle puppets for 5 days and then fostered them into another nest where hatching was 2 weeks overdue. The adult bald eagles adopted the new chicks and began feeding them immediately. As of

May 1, they were doing well and were expected to fledge in late May.

This year, the FWS is planning to release 2,000 masked bobwhite (*Colinus virginianus ridgwayi*) chicks onto the Buenos Aires NWR in southern Arizona between July and October. These chicks, hatched at the Patuxent Wildlife Research Center in Maryland, will be foster-parented by 257 sterilized male Texas bobwhites (*C. v. texanum*). A draft of the refuge master plan will be available for public comment by late summer or fall.

Region 3—A meeting on rare plants was held April 1-3 at the Missouri Botanical Garden in St. Louis. In attendance were representatives from the Region 3 and Washington Offices of Endangered Species, FWS Wildlife Permit Office, FWS Division of Research, FWS Regions 4, 5, and 6, National Park Service, The Nature Conservancy, State conservation agencies in Region 3, and several arboreta people and botany graduate students. The main objective of the meeting was to rank candidate plants found in the region for future listing and recovery actions. Other topics of discussion centered around reports on rare plant protection activities and concerns associated with the introduction of cultivated plants back into the wild.

On April 12, more than 3,500 people visited the Missouri Botanical Garden to participate in Missouri's Endangered Species Awareness Day. Presentations on various endangered animals and plants were held throughout the day, and there was a display center where many conservation organizations had set up booths. The event was a great success.

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Regional Briefs

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A workshop entitled "Die-offs of Freshwater Mussels in the United States" will be held June 23-25, 1986, in Davenport, Iowa. The workshop will be co-sponsored by the Fish and Wildlife Service and the Upper Mississippi River Conservation Committee. For further information, contact Dr. Richard Neves, Cooperative Fish and Wildlife Research Unit, Virginia Polytechnic and State University, Blacksburg, Virginia 24061; telephone 703/961-5927.

The Peregrine Fund's Boise, Idaho, facility is experiencing heavy embryonic mortality this year. Instead of the 40-60 peregrine falcon (*Falco peregrinus*) chicks that were expected for reintroduction, the number will be closer to 20. The cause of mortality is currently unknown.

Region 4—Mr. Wayne Dubuc, a private citizen of Morgan City, Louisiana, has provided the FWS with data that indicates the number of nesting bald eagles in Louisiana is continuing to increase. In 1974, five active territories were known with three successful nests producing four young. By 1980, there were 14 active territories with 12 successful nests producing 17 young. This year, 29 active territories with 23 successful nests produced 34 young. Some of the results may be attributed to improved surveys; however, the bulk of the increase is from new nest territories established as the lingering effects of the organochlorine pesticide era subside.

In the piedmont region of North Carolina, the Wilmington District U.S. Army Corps of Engineers is preparing to initiate a detailed study of bald eagle roost sites. Eagles began congregating on recently completed Corps reservoirs in 1984; numbers reached 42 in the summer of 1985. The information from the study, part of an ongoing Endangered Species Act (ESA) Section 7 consultation with the FWS, is necessary to evaluate proposed development of these lakes for public recreation.

On August 30, 1985, Hurricane Elena caused considerable damage to Alabama beach mouse (*Peromyscus polionotus ammobates*) Critical Habitat Zone #1. This zone, near the tip of the Fort Morgan peninsula, experienced high winds in excess of 100 knots and a storm surge over 8 feet. As a result, approximately 75 percent of the primary dunes were destroyed by wind and water erosion.

In January 1986, Bon Secour NWR purchased 800 hay bales for a dune restoration project. Through a combined

effort, FWS Jackson, Mississippi, Endangered Species Field Station and Bon Secour NWR personnel placed the hay bales where blow-outs had occurred in the primary dune line. An additional line of hay bales was placed seaward of the primary dunes to reestablish fore dunes, which function as an additional buffer from storms. Sand deposits began immediately, and within two weeks, drifts began to form. Now, the fore dune is over 50 percent reestablished and ready for vegetative plantings. Dune formation in the primary dunes is also progressing rapidly.

In March, FWS and Florida Game and Fresh Water Fish Commission personnel met with representatives of the Florida Department of Transportation to discuss the upgrading of U.S. Highway 1 in the Florida Keys. Two more adult American crocodiles (*Crocodylus acutus*) have recently been killed by automobiles along this heavily travelled highway. Proposed improvements for crocodile protection include the installation of bridges where crocodiles have traditionally crossed the road. Where bridges are not used, box culverts should be installed to allow crocodiles safe passage. Further, it was recommended that road widths be minimized to protect wetlands and that shoulder slopes be as steep as possible to discourage crocodile access. Lastly, it was recommended that guardrails, designed to exclude crocodiles from the roadway, be installed. To protect the Endangered key deer (*Odocoileus virginianus clavium*), it was suggested that rubble strips, flashing lights, reduced speed limits, additional signs, and speed bumps be employed to slow traffic through key deer habitat.

The U.S. Army Corps of Engineers submitted a management plan to the FWS for the deltoid spurge (*Euphorbia deltoidea* ssp. *deltoidea*), an Endangered plant, on U.S. Army property near Miami, Florida. A significant pine rockland forest, a habitat type that supports five federally protected species and several plant and animal listing candidates, is located on the property that is to be used as a reserve training facility.

The Army's management plan proposes to protect the deltoid spurge by restricting use of the pinelands to foot traffic, by providing prescribed burning, and by monitoring population changes in the plant. This plant is endangered throughout its range by conversion of pine rocklands for commercial and residential development. The FWS will provide a biological opinion on the proposed management plan to the Army, as required by Section 7 of the ESA.

The National Park Service (NPS) has entered into an agreement with the North Carolina Department of Agriculture to develop a training program under the Department's Plant Protection Program for NPS employees on identification and management of rare plant species on NPS land along the Blue Ridge Parkway. The mountainous area of western North Carolina is floristically diverse and supports many Federal listing candidate species, as well as several species which are both federally and State listed as Endangered or Threatened.

Two hundred people attended a public hearing held in Lake Waccamaw, North Carolina, regarding the proposed listing of the Waccamaw silverside as a Threatened species. (See story on proposed rule in BULLETIN Vol. X No. 12.) This small fish, endemic to Lake Waccamaw, is a short-lived species that is sensitive to water quality degradation.

Status surveys of four Category-2 plant listing candidates have been completed by the North Carolina Department of Agriculture's Plant Protection Program, under contract with the FWS. Two of these species, *Eupatorium resinosum* and *Calamovilfa brevifolia*, are native to the coastal plain of the Carolinas and Virginia and the pine barrens of New Jersey. The other two, *Hexastylis lewisii* (North Carolina and Virginia) and *Arenaria alabamensis* (North Carolina, South Carolina, and Alabama) are native to the piedmont region. The status survey information will be evaluated further before decisions on Federal listing proposals are made.

The feasibility of establishing an inter-agency Florida Panther Advisory Council, similar to the one established for the grizzly bear (*Ursus arctos horribilis*), was discussed at a workshop held at Everglades National Park in February. Staff from State and Federal agencies distributed a draft memorandum of understanding, and agency heads were asked to consider the initiative and provide their comments at a later date. The FWS also presented the first draft of the revised Florida Panther (*Felis concolor coryi*) Recovery Plan, which should be completed by the end of fiscal year 1986.

Region 5—Translocated Alaskan bald eagles comprise at least 50 percent of the two new pairs of adult birds on territory in the State of New York this spring. One pair, consisting of at least one Alaskan eagle, is nesting at Iroquois NWR, 7 miles west of the 1982 release site. The birds are incubating, and hatching is expected about mid-May. The other pair, a 1982 Alaskan eagle and the 1978 bird from the Patuxent Wildlife Research Center's captive breeding program, has

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been keeping company at Montezuma NWR. This pair is not nesting yet, but the pair bond is forged.

Region 6—Plans are progressing for construction of the black-footed ferret (*Mustela nigripes*) captive breeding facility at the Wyoming Game and Fish Department's (WGFD) Sybille Research Unit near Wheatland, Wyoming. The WGFD is currently soliciting comments from the public as required for an environmental assessment of the site before construction can begin.

This year's attempt to breed captive ferrets does not appear to have been successful. One female black-footed ferret was successfully bred, but pregnancy did not occur. Pairing of captive ferrets continued through April.

The Captive Breeding Specialist Group, chaired by Dr. Ulysses S. Seal, met with the WGFD in Laramie, Wyoming, on April 5 and 6. The purpose of the meeting was to discuss current attempts to breed the captive animals, to identify research needed to better ensure success of captive breeding, to discuss strategies for locating additional ferrets, and to plan for a workshop in August to discuss the reproductive physiology of mustelids.

A National Audubon Society television presentation, "The Mysterious Black-footed Ferret," is currently scheduled for airing on WTBS (cable Channel 17) on June 5 at 9:05 p.m., Eastern Standard Time. This film was produced by Ray Paunovich of Natural Image Films, Worland, Wyoming. He worked closely with the WGFD while photographing this rare mammal in its natural habitat near Meeteetse, Wyoming.

As of April 21, there were nine confirmed sightings of migrating whooping cranes: one in Oklahoma, one in Kansas, five in Nebraska, one in North Dakota, and one in Texas. These sightings cover the period from March 4 through April 21. As of April 17, five birds remained at Aransas NWR. Migrating whoopers are not expected to be seen much later than May 1.

Region 7—The first phase of a study to test the feasibility of using the toxicant Compound 1080 for removing introduced Arctic foxes (*Alopex lagopus*) from selected Aleutian Islands is now complete. These foxes have depleted many avian populations, including the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*).

Approximately 49,000 single-lethal-dose baits were placed on Kiska Island in late March and early April. Of the 185 fox carcasses subsequently found, 132 were buried on site. Rough terrain prevented the retrieval and burial of the remaining carcasses.

Four glaucous-winged gulls and a sea lion pup were also found dead. Although the causes of death are unknown, the sea lion is believed to have been a stillbirth. The gulls and sea lion carcasses and tissue samples from 66 of the dead foxes were collected, and have been sent to the Denver Wildlife Research Laboratory where they will be tested for the presence of Compound 1080.

Population surveys of foxes and non-target species were completed on Kiska before Compound 1080 baits were dispersed. To assess the overall effects of the effort, biologists will return to the island in June 1986 to continue the intensive surveys initiated in June 1985.

Region 8 (Research)—The only known wild California condor (*Gymnogyps californianus*) pair laid their second egg of the year on or about April 13. On April 15, Condor Research Center (Ventura, California) personnel removed the egg from the nest (as they had with fragments of the first egg) and transported it by helicopter to the San Diego Zoo for incubation. The egg is of normal shape, size, and shell thickness, and is fertile. Researchers hope the pair will recycle to produce a third egg.

Two additional California condors, both male, were captured from the wild by Condor Research Center personnel. One bird, the only wild one not genetically represented in the captive flocks, was captured on April 21 at Tejon Ranch and taken to the Los Angeles Zoo. The other was captured on April 22 at Hudson Ranch, where its radio transmitter was replaced, blood sampled for lead (low levels of lead were found), and released.

The California sea otter (*Enhydra lutris nereis*) population was surveyed by FWS and California Department of Fish and Game biologists in late January and early February. Survey conditions were generally good to excellent, and resulted in counts of 1,231 independent otters and 181 dependent pups for a total of 1,412. This is the eighth in a series of counts that began in 1982.

The technique used involves surveying as much of the range as possible from land-based observation points with the aid of high-powered telescopes. Areas that cannot be counted from shore are surveyed from an airplane. Numbers obtained since this method was initiated have been remarkably consistent, varying only about 5 percent. Service biologists believe that the technique has excellent potential for detecting changes in the California population of sea otters. Results obtained thus far, when compared with previous counts, indicate no trends in growth of the population since the early-to mid-1970's.

Recovery Plan Update

The following recovery plans were approved on April 14, 1986, by the FWS: *Nichol's Turk's Head Cactus Recovery Plan*; *Siler Pincushion Cactus Recovery Plan*; and *Chihuahua Chub Recovery Plan*.

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone (toll-free) 800/582-3421.

Ivory-bill Rediscovered

Dr. Lester Short of the American Museum of Natural History, along with seven other individuals, recently reported the rediscovery of the Cuban subspecies of the ivory-billed woodpecker (*Campephilus principalis bairdii*) in Cuba. They found two birds (possibly three) with enough available habitat to support a few more. The FWS is in the process of determining the status of the U.S. subspecies.

U.S. CITES Annual Reports Available

By Jeffrey P. Jorgenson
Federal Wildlife Permit Office

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a treaty ratified by 89 countries (including the United States), regulates international trade in certain taxa in order to ensure their survival in the wild. Each member of CITES is required to compile an annual report that summarizes its international trade in CITES-regulated species. The purpose of this report is two-fold: 1) to monitor world trade in CITES-regulated plants and wildlife and 2) to assess the extent to which CITES is being implemented by the member countries.

The Federal Wildlife Permit Office, on behalf of the United States, has compiled U.S. annual reports since 1977. The reports identify the species in trade, the form of the specimen or products, the countries involved (countries of origin, reexport, or import), the source (wild, artificially propagated, or captive-
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CITES

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bred), and disposition of the shipment (cleared, seized, or refused entry). These reports, and those of the other members, are reviewed annually by the CITES Secretariat in Switzerland and the Wildlife Trade Monitoring Unit (an element of the International Union for the Conservation of Nature and Natural Resources) located in the United Kingdom. Discrepancies are called to the attention of the countries involved. Frequently, the U.S. report includes trade not reported by other countries.

These data also are reviewed by scientists and compared to population data in order to determine if species merit further regulation or if other actions are necessary. For example, at the last CITES meeting in Buenos Aires, Argentina, member countries adopted stricter controls for 7 taxa and reduced or removed controls for 22 taxa.

Copies of U.S. annual reports are available from the National Technical Information Service (address below). More specific details on U.S. and foreign trade may be obtained from the Federal Wildlife Permit Office (FWPO/MOB), 1000 N. Glebe Road, Room 611, Arlington, Virginia 22201 (telephone: 703/235-2418).

U.S. CITES Annual Reports

1977 Report No. PB 84 146133
\$11.50 - printed (A05)
\$ 4.50 - microfiche (A01)

1978 Report No. PB 84 146141
\$14.50 - printed (A10)
\$ 4.50 - microfiche (A01)

1979 Report No. PB 82 128646
\$19.00 - printed (A10)
\$ 4.50 - microfiche (A01)

1980 Report No. PB 83 143198
\$22.00 - printed (A12)
\$ 4.50 - microfiche (A01)

1981 Report No. PB 83 188524
\$40.00 - printed (A24)
\$ 4.50 - microfiche (A01)

1982 Report No. PB 84 146158
\$23.50 - printed (A13)
\$ 4.50 - microfiche (A01)

1983 Report No. PB 85 241370
\$26.50 - printed (A15)
\$ 4.50 - microfiche (A01)

1984 Report No. PB 86 184447/AS
\$22.95 - printed (A13)
\$ 5.95 - microfiche (A01)

To order, write to the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, or telephone the sales desk at (703) 487-4650.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	93	6	1	23	3	2	128	46
TOTAL	267	51	458	73	13	37	899	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 29 animals
45 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

May 6, 1986

May 1986

Vol. XI No. 5

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Federal Protection Proposed for Five Species

During the month of May, the Fish and Wildlife Service (FWS) proposed to add the following species, four animals and one plant, to the U.S. List of Endangered and Threatened Wildlife and Plants:

Mount Graham Red Squirrel (*Tamiasciurus hudsonicus grahamensis*)

The red squirrel, *Tamiasciurus hudsonicus*, is found in most of Canada and Alaska, and in many of the western and northern parts of the conterminous United States. This species is arboreal and, in the southern extremities of its range, is restricted mainly to montane forests. It is grayish-brown, tinged with a rusty or yellowish color along the back, and has a bushy tail. One of the southernmost subspecies of red squirrel is *T. h. grahamensis*, the Mount Graham red squirrel, which is known only from the Pinaleno (or Graham) Mountains of Graham County, Arizona. This red squirrel is now found within the Coronado National Forest, primarily in stands of dense Engelmann spruce and/or fir at elevations mostly above 10,000 feet (3,048 meters).

The Mount Graham red squirrel was common around the turn of the century, but was declining by the 1920's and rare by the 1950's, presumably due to the loss and disruption of its forest habitat. Another possible factor in the decline may be competition with an introduced population of the tassel-eared squirrel (*Sciurus aberti*). From 1958 to 1967, there was only a single unconfirmed report of the red squirrel subspecies, and there was concern that it had become extinct. Later, however, its survival was verified, and a FWS-funded status survey in 1984-1985 found signs of this mammal at 16 localities in the Pinalenos. Although the squirrel does still survive, its range and numbers have been substantially reduced, and it appears to be common only in small, scattered patches of the best habitat. The total remaining red squirrel population in the Pinalenos is estimated at fewer than 500 individuals, possibly close to only 300.

The decline of the Mount Graham red squirrel seems to parallel the expansion of logging operations in the Pinalenos,



Mount Graham red squirrel

which began in the 1880's but was not initially widespread. By 1933, roads had been constructed to the crest of the mountains, and by 1973, most of the accessible timber had been cut, thereby

reducing the red squirrel's forest habitat. Future timber harvesting in the Pinalenos could result in a further decline of the squirrel's population.

(continued on page 4)

photo by Rich Gliniski



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of May:

Region 1—The Sacramento Endangered Species Office (SESO) reported that six bald eagles (*Haliaeetus leucocephalus*) eggs were taken from three Cali-

fornia nests in an attempt to increase production. The eggs were transferred to the Santa Cruz Predatory Bird Research Group for hatching, where three of them hatched successfully. The nestling eagles will become part of a captive breeding population to be held

at San Francisco Zoo or will be released in the wild through hacking.

The SESO staff also coordinated the development of the Interagency Pit River Bald Eagle Management Plan. It was developed by the U.S. Forest Service, Bureau of Land Management, California Department of Fish and Game, and Pacific Gas and Electric Company. The plan provides for long-term management of nine currently active bald eagle nesting territories, expansion of three additional territories, and habitat for nonbreeding and wintering eagle use.

The FWS Great Basin Complex at Reno, Nevada, reported that a pair of Endangered bald eagles is again present in the Salmon Falls River Canyon near Jackpot, Nevada. A pair of eagles was present at the same place a year ago, but the nest was abandoned in mid-April following human disturbance in the area. The return of a nesting pair is a significant event because no successful nesting of bald eagles in Nevada has been known since 1866.

Forty-two eggs were removed from 14 California peregrine falcon (*Falco peregrinus*) nest sites by The Peregrine Fund at Santa Cruz in a continued effort to improve wild reproduction. Artificial or "dummy" eggs were placed in 13 of the nests, while the fourteenth pair was allowed to "double clutch," or lay a second set.

A recent oil spill in Buena Vista Valley resulted in the death of 14 giant kangaroo rats (*Dipodomys ingens*). This animal is currently proposed for Endangered Species Act (ESA) listing. (See story in BULLETIN Vol. X No. 9.) A meeting is planned with representatives of several oil companies to discuss clean-up and restoration.

A project involving the expansion of a refined petroleum products pipeline from Norwalk to San Diego, California, by the San Diego Pipeline Company has resulted in extensive damage to wetland habitats of San Elijo Lagoon. The FWS informed the COE and the pipeline company that there could be possible impacts to the least Bell's vireo (*Vireo bellii pusillus*) proposed Critical Habitat, the light-footed clapper rail (*Rallus longirostris levipes*), and the California least tern (*Sterna antillarum browni*).

Figures recently released by the Oregon Department of Fish and Wildlife and the Klamath Indian Tribe revealed that sucker populations in the Klamath River basin are experiencing a precipitous decline. The average number of shortnose suckers (*Chasmistes brevirostris*) and Lost River suckers (*Deltistes luxatus*), both Category-2 listing candidates, that were captured during each

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Listings Become Final for Four Plants and Nine Animals

The following U.S. and foreign taxa were added to the Federal List of Endangered and Threatened Wildlife and Plants during May 1986:

***Chrysopsis floridana* (Florida Golden Aster)**

This perennial herb in the family Asteraceae is endemic to small areas of ancient dunes in Hillsborough, Manatee, and Pinellas Counties, Florida. The plants grow in open, sunny areas within sand pine/evergreen oak scrub vegetation on well-drained, fine sand. Urbanization has eliminated *C. floridana* from much of its historical range, and the two largest remaining sites are vulnerable to residential construction. All known populations are on privately owned lands.

C. floridana was proposed by the FWS for listing as an Endangered species on August 5, 1985 (see summary in BULLETIN Vol. X No. 9), and the final rule was published in the May 16, 1986, *Federal Register*.

***Scaevola coriacea* (Dwarf Naupaka)**

Although once prevalent throughout the main Hawaiian Islands, this prostrate shrub in the family Goodeniaceae now survives on only four small areas of State and private land in Maui County. Two of the sites are on Maui itself, one is on a nearby islet, and one is on an islet east of Moloka'i. The only significant population, one near Waiehu Point on the island of Maui, is threatened by residential development, which will eliminate nearly two-thirds of the species' total habitat.

The July 16, 1985, proposal to list *S. coriacea* as Endangered (see summary in BULLETIN Vol. X No. 8) was made final on May 16, 1986.

***Illamna corei* (Peter's Mountain Mallow)**

A single population of this perennial in the family Malvaceae exists on private land near the summit of Peter's Mountain in Giles County, western Virginia. *I. corei* is known only from that site, and the September 1985 count of five individual plants is about one-tenth the number noted when the species was discovered in 1927. Encroachment of the site by competing vegetation, particularly the non-native Canadian leafcup (*Polymnia canadensis*), is reducing the open sunlight apparently needed by *I. corei*. Because of the species' very low numbers, browsing by white-tailed deer (*Odocoileus virginianus*) is another sig-

nificant factor in reducing or suppressing the population.

I. corei was proposed for listing as an Endangered species on September 30, 1985 (see summary in BULLETIN Vol. X No. 10), and the listing became final on May 12, 1986.

***Cycladenia humilis* var. *jonesii* (Jones Cycladenia)**

This member of the dogbane family (Apocynaceae) is a herbaceous perennial that reaches 4 to 6 inches (10 to 15 centimeters) in height and produces rosy flowers said to resemble small morning-glories. It is known to occur only on three general areas of the

Canyonlands region of southeastern Utah; a fourth population may at least once have occurred near a section of the Utah/Arizona border. Of a total of approximately 7,500 known individuals, more than half of the plants are on Bureau of Land Management lands, about 2,500 are on units of the National Park System (Glen Canyon National Recreation Area and Capitol Reef National Park), and around 500 are on State of Utah lands.

Oil and gas leases have been issued either on or immediately adjacent to all of the species' known extant sites, and mining claims have been staked in the

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drawing by Susan Sizemore

Illamna corei

Final Listings

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vicinity of the San Rafael Swell population. Off-road vehicle traffic, exploration, and other activities associated with the potential future development of these areas already are damaging the habitat.

In light of these threats, the FWS proposed on January 10, 1985, to list the Jones cycladenia as an Endangered species. Subsequently, the National Park Service located several additional colonies that more than doubled the previously known total population. Because of the increased numbers but continuing threats, the FWS decided that a final listing of the species as Threatened (rather than Endangered) was more appropriate. The final rule was published May 2, 1986.

Least Bell's Vireo (*Vireo bellii pusillus*)

No other passerine (perching songbird) in California is known to have declined as dramatically as the least Bell's vireo. This small, gray, migratory bird once was widespread and abundant, its historical breeding range extending from interior northern California to northwestern Baja California, Mexico. Over the past several decades, however, the subspecies has been completely extirpated from the Sacramento and San Joaquin Valleys, which were at the center of its breeding range. The vireo's U.S. range is reduced to southwestern California, within which it survives in isolated remnants of dense, willow-dominated riparian habitat. This restricted habitat type is limited to the immediate vicinity of water courses.

Almost all of the subspecies' historical riparian habitat has been destroyed by flood control and water development projects, crop production, livestock grazing, invasive exotic plants, off-road vehicles, and urbanization. Despite growing concern at all levels of government about the decline of riparian vegetation, substantial amounts continue to be lost each year. Approximately 65 per-

cent of the remaining U.S. population of the least Bell's vireo is threatened by at least four major construction projects (details in May 2, 1986, *Federal Register*).

The brown-headed cowbird (*Molothrus ater*), a species that is able to adapt to human-related changes in the habitat, is greatly increasing its range in California. Cowbirds do not build their own nests, but instead parasitize the nests of other bird species, including (but not limited to) those of the vireo. This problem is compounding the other pressures facing the vireo and greatly reducing the subspecies' nesting success within the remaining breeding habitat.

Along with its May 3, 1985, proposal to list the least Bell's vireo as Endangered (summary in BULLETIN Vol. X No. 6), the FWS also proposed designation of Critical Habitat for the bird. However, the FWS is required to evaluate economic impacts of such designations, and because of the complexities and extent of the activities being assessed, the evaluation is not yet complete. Concurrently with the May 2, 1986, publication of the rule listing the least Bell's vireo as Endangered, the FWS reopened the public comment period on the proposed Critical Habitat designation until July 31, 1986. (Comments should be sent to the Regional Director, Region 1—see BULLETIN page 2). A final decision on designating Critical Habitat must be made no later than May 3, 1987. In the meantime, the vireo will receive the other habitat protection measures authorized under Section 7 of the Endangered Species Act.

Eight Foreign Mammals

On October 25, 1985, the FWS proposed listing eight foreign mammals as Endangered. (See feature in BULLETIN Vol. X No. 11.) Three of these are threatened by deforestation: **Leadbeater's possum** (*Gymnobelideus leadbeateri*), one of Australia's endemic marsupials, and the **buffy tufted-ear marmoset** (*Callithrix jacchus aurlita*), and **southern bearded saki** (*Chiropotes satanas satanas*), two Brazilian primates. Four Cuban rodents, the **large-eared hutia** (*Capromys auri-*

tus), **little earth hutia** (*C. sanfeliipensis*), **dwarf hutia** (*C. nana*), and **Cabrera's hutia** (*C. angelcabrerai*), are taken for use as food by fishermen and others who visit the tiny islands where these animals live. The **Baluchistan bear** (*Ursus thibetanus gedrosianus*), restricted to mountains in Pakistan and, possibly, Iran, is regarded as vermin and killed by farmers, who claim that it damages their crops and kills livestock.

The final rule listing these foreign animals as Endangered was published May 5, 1986. Although U.S. law cannot protect animals and their habitat in other countries, the Endangered Species Act does prohibit their importation into the U.S., except under Federal permit for conservation purposes. Also, through Section 8 of the Act, the Secretary of the Interior is authorized to provide funding (if money is available) and training assistance to foreign wildlife departments.

Available Conservation Measures

The FWS is required by the Endangered Species Act to develop and implement recovery plans for all listed species in the U.S. Further, the Act makes it illegal to take, possess, transport, and engage in interstate or international trafficking in listed animals without a permit. Similar protection is afforded to listed plants, except that the prohibition on taking applies only to collection of listed plants from lands under Federal jurisdiction. Some States, however, have their own laws regarding the take of listed plants on private lands.

Habitat conservation is addressed in Section 7 of the Act, which requires Federal agencies to ensure that activities they fund, authorize, or carry out are not likely to jeopardize the survival of listed species or adversely modify designated Critical Habitat. Because Critical Habitat designations require publication of detailed habitat descriptions and maps, it was deemed prudent to forego this action for species that are particularly vulnerable to collecting or vandalism; nevertheless, their habitat is protected under Section 7.

Proposed Species

(continued from page 1)

Additional threats to the subspecies include the proposed construction of an astrophysical facility on Mount Graham, road construction and improvements, and recreational developments, including picnic areas, campgrounds, and ski facilities. Considering the squirrel's low numbers and restricted range, any new habitat disturbances could contribute to its extinction.

On May 21, 1986, the FWS published a proposed rule in the *Federal Register* to list the Mount Graham red squirrel as Endangered. Given its history of decline, its vulnerability, and the multiplicity of problems that confront it, this animal could greatly benefit from the protection of the Endangered Species Act (ESA).

Critical Habitat for the Mount Graham red squirrel has been designated in the proposed rule to include three areas in the Coronado National Forest—Hawk

Peak/Mount Graham, Heliograph Peak, and Webb Peak. These three areas, which cover a total of approximately 2,000 acres (800 hectares), contain the major known concentrations of the subspecies and the habitat necessary to its survival, including cover, food sources, and nest sites. Potential activities that could adversely affect the Critical Habitat include timber harvesting, recreational development, and construction of the proposed astrophysical facility on

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Mount Graham. Since all of the proposed Critical Habitat of the Mount Graham red squirrel is located within a national forest, any of these activities could require the U.S. Forest Service to enter into consultation with the FWS, under Section 7 of the ESA.

Comments on this proposed rule are welcome and should be sent to the Regional Director, Region 2 (address on page 2), by July 21, 1986.

Blackside Dace (*Phoxinus cumberlandensis*)

This small fish, which inhabits cool-water streams in the upper Cumberland River system in southeastern Kentucky and northwestern Tennessee, is believed to have disappeared from many waters within its historical range. Degradation of its aquatic habitat by certain mining, logging, agricultural, and road construction activities is blamed for the decline. Because of continuing threats to the limited amount of remaining habitat, the FWS proposed listing the species on May 21 as Threatened.

The blackside dace is a distinctively marked fish, with a single black lateral stripe, a green/gold back dotted by black specks, a pale to sometimes brilliant scarlet belly, and fins that are often bright yellow. It is usually less than 3 inches (7.6 centimeters) in length. Streams inhabited by the dace are only 7 to 15 feet (2 to 4.5 meters) wide with moderate flows, undercut banks, and large rocks. Good riparian vegetation appears to be necessary for minimizing silt and maintaining cool water temperatures. The species is not found in streams that have become excessively silty.

Although the extent of the blackside dace's historical distribution is not known, available records show that it has been extirpated from at least 10 streams. Physical habitat evaluations indicate that it also may have occurred in at least 52 other streams, from which it was eliminated before its discovery in 1975. Currently, the species is known from a total of only about 14 stream miles (22.5 kilometers) scattered throughout 30 separate streams. Only nine of these streams, consisting of approximately 8 miles (13 km) of habitat, are estimated to contain healthy dace populations. Most of the other populations are being affected by siltation or some other factor that seriously limits their size and vigor.

The areas of Kentucky and Tennessee inhabited by the blackside dace are rich in coal reserves and forest resources. It is believed that habitat degradation associated with the development of these resources is responsible for the loss of many dace populations. The most frequently cited continuing threat consists of problems related to coal mining (silt and acid drainage), followed in



photo by John MacGregor



photo by Dick Biggins

Good stream habitat for the blackside dace (above). Road construction and siltation (below) have eliminated the fish from some of its former range.

order of impact by logging, road construction, agriculture, development, and natural low water flows.

In the listing proposal, the FWS emphasizes that current mining activities conducted in accordance with State and Federal regulations are not a serious threat to the species. It was past unregulated mining that contributed to the decline of the blackside dace, although the lingering effects of erosion and acid drainage from old mining sites probably are a continuing threat. Current mining operations not in full compliance with applicable regulations is another possible danger.

Federal activities that could affect the dace and its habitat include, but are not limited to, issuance of permits for sur-

face mining; abandoned mine land reclamation; road and bridge construction; and timber management on Federal lands. It should be emphasized, however, that considering the needs of vulnerable species early in project planning almost always prevents potential conflicts and allows project goals to be met while providing for species conservation.

Comments on the proposal to list the blackside dace as Threatened should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by July 21, 1986.

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Florida Scrub Jay (*Aphelocoma coerulescens*)

The Florida scrub jay is a bluish-colored, crestless bird that reaches 12 inches (30 centimeters) in total length. A necklace of blue feathers separates its white throat from gray underparts, and a white line over the bird's eye often blends into a whitish forehead. Florida scrub jays are long-lived (10 years or more), sedentary, and permanently monogamous. They are omnivorous, eating almost anything they can catch, but they concentrate on lizards and arthropods in spring and summer, and acorns in fall and winter.

The species *Aphelocoma coerulescens* is widely distributed in the western United States, but the Florida subspecies, *A. c. coerulescens*, is restricted to scattered and often isolated patches of oak scrub in peninsular Florida, which occurs on fine, white, drained sand. These areas have high real estate value in this rapidly growing State, and as a

result, many of the coastal areas inhabited by the Florida scrub jay have been cleared for construction of beachfront hotels, houses, and condominiums. Scrub habitats in the interior of the Florida peninsula are also changing; they are subject to development for citrus groves as well as for housing developments. In many areas, scrub jays are barely hanging on, and they will probably disappear from these areas within a few years as land clearing continues.

In the past, scrub jays were reported to have occupied 40 Florida counties, but today they have been completely eliminated from some areas (40 percent of their historical locations), and their numbers have drastically declined in others. The Florida scrub jay's total population has dropped by about half in the past century, leaving between 15,000 and 22,000 birds now known to survive. Of these remaining jays, over 80 percent occur in only two general areas: Merritt Island/Cape Canaveral (Brevard County) and Ocala National Forest (Lake, Marion, and Putnam Counties). Elsewhere, only small populations are

scattered throughout peninsular Florida.

By far, habitat destruction has played the major role in the Florida scrub jay's decline, but there is evidence that, in St. Johns County at least, some scrub jays have been shot by vandals. In addition, the tameness and beauty of this bird make it desirable as a pet, and although illegal, it has been used for such a purpose in the past. Another threat to this vulnerable bird's existence is the suppression of fires to protect human interests. Historically, natural-caused fires were major factors in maintaining the sparse, low scrub vegetation preferred by *A. c. coerulescens*.

Although the Florida scrub jay is protected by the Migratory Bird Treaty Act and Florida State law, these laws do not protect the bird from habitat destruction. To protect and manage the surviving populations, the FWS proposed to list this subspecies as Threatened on May 21, 1986. If the proposed rule is made final, the protection authorized by the Endangered Species Act may prevent further peril to this bird.

There are four known Federal agencies whose activities may be affected if the Florida scrub jay is listed as a Threatened species. They are the Fish and Wildlife Service (Merritt Island National Wildlife Refuge), National Aeronautics and Space Administration (Kennedy Space Center), U.S. Air Force (Cape Canaveral Air Force Station and Avon Park Bombing Range), and U.S. Forest Service (Ocala National Forest). Impacts on these agencies, however, should be minimal since, to varying degrees, they are already managing their lands in accordance with the scrub jay's needs. The subspecies also occurs on lands managed by the State of Florida, which has informally notified the FWS that it fully supports the proposed listing.

Comments on this listing proposal are invited and should be sent by July 21, 1986, to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207.

Cambarus zophonastes

Cambarus zophonastes, a cave crayfish endemic to the White River Basin in north-central Arkansas, was proposed for listing as Endangered on May 5, 1986. First collected in 1961, its only known habitat is a cave located in the Ozark Mountains in Stone County. Over 170 other caves in north-central Arkansas have been searched, but there has been no additional evidence of the species. In Missouri, numerous caves and several springs were surveyed, but only two closely related species were found, *C. hubrichti* and *C. setosus*.

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The Florida scrub jay's future depends to a great extent on the fate of its oak scrub habitat.

photo courtesy of Florida Audubon Society



photo by Ken Smith

Cambarus zophonastes is an obligate cave dweller that grows to about 2.5 inches (65 mm) and lacks pigment in the body and eyes.

The cave in which *C. zophonastes* dwells is a solution channel, most of which is wet year-round. It contains a considerable amount of mud, and many of its passages are flooded during storms and wet seasons. About 150 feet (45 meters) inside the cave is a pool with a narrow, shallow stream entering into it from the cave's interior. The crayfish has been found only in this cave pool.

One factor that threatens this cave species' existence is its relatively low reproductive capability, which is partially due to the limited energy available in most caves. The cave inhabited by *C. zophonastes* likely once served as a maternity roost by the gray bat (*Myotis grisescens*), itself now listed as Endangered. Abandonment of the roost site represented a loss of energy input, in the form of guano, to the cave's aquatic community; as a result, the available food supply for the crayfish and other species dwindled.

Groundwater contamination now presents the main threat to *C. zophonastes*. The only known population of the species, consisting of approximately 50 individuals, is in a geographic area characterized by sinking streams, which lose significant quantities of water into the subsurface in very localized areas. Sinking streams are of extreme importance in supplying water and nutrients

to caves, but they also can readily introduce pollutants or contaminants into the cave system. A hydrological study conducted in 1985 has positively identified threats to this system, and they ultimately may threaten the remaining population of *C. zophonastes*. Continuing development in the area also threatens the water quality in the cave due to the use of septic tanks to dispose of wastewater. This water degradation problem may involve the Environmental Protection Agency or other agencies with jurisdiction over groundwater. If the crayfish becomes listed, these agencies may be required to consult with the FWS under Section 7 of the Endangered Species Act to ensure that their activities will not likely jeopardize this species' survival. The Federal Housing Authority may also be required to consult with the FWS on loans for housing developments within the cave's recharge area.

The crayfish also is vulnerable to vandalism and taking. With such a small surviving population in one location, these threats or any other adversity could bring about the extinction of *C. zophonastes*. If the proposed rule to list the species is approved, the Endangered Species Act will give *C. zophonastes* the greatest Federal protection available.

Comments on the proposed rule are welcome and should be sent by July 7,

1986, to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

Wide-leaf Warea (*Warea amplexifolia*)

W. amplexifolia, a summer annual in the mustard family (Brassicaceae), is an erect herb growing up to about 3 feet (0.8 meter) in height. Its slender, branching stems arise from an elongate taproot and bear small, heart-shaped leaves. The showy, pale purple flowers are borne in puff-like clusters at the ends of the branches.

Endemic to the Lake Wales Ridge of central Florida, *W. amplexifolia* was known historically from 10 sites in Lake County, western Orange County, extreme northwestern Osceola County, and northern Polk County. It is now limited, however, to only four sites in Lake and Polk Counties. All six of the others were destroyed when their habitat was converted to citrus groves or was urbanized. Three of the remaining sites are privately owned; two of them, including the location of the largest population, are very vulnerable to development pressures, while the third is in a preserve

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Proposed Species

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at Bok Tower Gardens. The fourth is on a 1-acre (0.4-hectare) woodland within Lake Griffin State Recreation Area. Altogether, fewer than 1,200 plants are known to survive on a total of less than 65 acres (26 ha) of land.

The FWS proposed on May 16 to list *W. amplexifolia* as Endangered. Comments on the proposal should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207, by July 15, 1986.

Effects of the Listings, if Approved

If each of the proposals is made final, these five species will receive all the protection benefits authorized by the Endangered Species Act. Among these benefits are the requirement for the FWS to develop and implement plans for the species' recovery, possible Federal aid to State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Act, Federal agencies are required to ensure that any activities they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species or adversely modify its Critical Habitat. If a Federal

agency finds that one of its activities may affect such a species, it must consult with the FWS on ways to avoid jeopardy. These Section 7 regulations will apply to all five species if they are listed, even though a formal designation of Critical Habitat was not part of the proposed rules for the blackside dace, the cave crayfish, the scrub jay, or the wide-leaf warea.

The Act also prohibits the possession, take, or transport of listed animals. For listed plants, the rule is different; removing Endangered plants is illegal only if the plants are located on Federal lands. Interstate or international trafficking in listed species is also prohibited, except under Federal permit.

Approved Recovery Plan

Lotis Blue Butterfly

Perhaps the rarest resident butterfly in the United States, the Lotis blue (*Lycaeides idas* (formerly *argyrognomon*) *lotis*) is known to survive only at a 5-acre (2-hectare) site in Mendocino County, California. During 1977-1981, only 16 adult specimens were seen in 42 days of field searching at the site. The restricted range and small population size of this butterfly make it highly vulnerable to extinction from natural or human-related changes in its habitat, and it was listed in 1976 by the FWS as Endangered. Specific recommendations in the *Lotis Blue Butterfly Recovery Plan* may, when implemented, restore the subspecies to a secure status.

The Lotis blue butterfly probably was never abundant, but historical records indicate seven localized occurrences in coastal areas of Mendocino, northern Sonoma, and, possibly, Marin Counties. Its habitat consisted of wet meadows and sphagnum-willow bogs. Today, the sole known population is found at a sphagnum bog in the Pygmy Forest north of the town of Mendocino. The butterfly's larval foodplant has not been positively identified, but the coast trefoil (*Lotus formosissimus*), a herbaceous perennial legume, is considered the primary candidate.

The reasons for the decline of the Lotis blue butterfly are largely speculative or limited to circumstantial evidence. Natural factors could be at least partially responsible. Abundance of the butterfly's suspected larval foodplant has been affected by drought and succession of the plant community. Under more natural conditions, and with the other colonies as a reserve, the butterfly probably could recover from such habitat changes; many butterfly taxa undergo cyclical population highs and lows. Human land management practices, however, also may be affecting the Lotis

blue butterfly. For example, fire suppression promotes vegetational succession. Logging of the forests also can reduce the foodplant supply through associated hydrological changes and through road construction, which opens logged areas for urbanization. The recovery plan points out, however, that foodplant distribution is not necessarily the key to the presence of the Lotis blue butterfly because the butterfly does not occur in all areas that contain *L. formosissimus*.

At present, the remaining colony's habitat is in a near natural condition; however, because it is so small, it is vulnerable to even a very localized disturbance. Potential threats include logging, powerline corridor maintenance, use of herbicides or insecticides, and impoundment or drainage of water. Several exotic annual grasses are abundant and may need to be removed before they completely displace the native vegetation. Because the population is so small, another threat is collecting.

Recovery Actions

The *Lotis Blue Butterfly Recovery Plan*, written under contract by Dr. Richard A. Arnold and approved by the FWS on December 26, 1985, recognizes that there is a critical need for more information before specific recovery strategies and goals can be established. A primary element of the recovery plan is to conduct additional research into the life history, distribution, and habitat requirements of the Lotis blue. Also needed is a more complete understanding of the factors leading to the butterfly's decline.

The interim objectives of the recovery plan are: 1) to protect the butterfly and its habitat at the existing site; 2) to establish three new self-sustaining populations at other sites of at least equal area; and 3) to determine the population levels and habitat conditions necessary for reclassification and eventual recovery.

Preserving the only known habitat obviously is the first priority. The recovery plan recommends seeking a conservation agreement with the property owner and development of a Land Protection Plan, while coordinating with State and local governments, the California Coastal Commission, and nearby landowners. Certain land management practices may affect the butterfly's chances for recovery. For example, drift from aerial, non-specific applications of herbicides and insecticides could swiftly kill off the Lotis blue butterfly or eliminate its host and nectar plants. If the use of such chemicals is absolutely necessary, the FWS will encourage application by hand on specific targets. The recovery plan also recommends that activities like over-draft of the aquifer and "brushing" of the vegetation for fire control, which could remove or damage the host plants, be minimized as much as possible. Cooperation with Pacific Gas and Electric, which owns a right-of-way through the butterfly habitat, will be important.

Another important part of the recovery plan is to continue surveying potential habitat in order to locate any additional Lotis blue butterfly populations that may still exist. Among the areas that should be visited during the butterfly's flight season are historical collection sites near Point Arena, Pygmy Forest, Russian Gulch State Park, Van Damme State Park, Big River, and Big Lagoon, which may still, or once again, contain some suitable habitat. However, research to positively determine the larval and adult food plants of this butterfly, along with studies on other aspects of its autecology, is needed to make such surveys fully effective. When this information is gathered, biologists can evaluate vegetation management and identify potential reintroduction habitat for the butterfly.

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Recovery Plan

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Two different methods of establishing the additional populations of the Lotis blue butterfly called for in the recovery plan will be examined. The first possibility is to move some of the adults from the extant site to other locations; this may be attempted only if and when it is determined that the extant population is large enough to withstand the reduction and remain self-sustaining. The other possibility is to bring some of the butterflies into a laboratory for captive propagation, with the goal of releasing their offspring at new sites. Again, such an approach would depend on the status of the extant population. Rearing and relo-

cation techniques would first be developed using related, but non-endangered, butterfly taxa. Surrogates also could be used in formulating management and survey methods to be used in other aspects of the Lotis blue recovery plan.

Following the establishment of four colonies of the Lotis blue butterfly, the plan can be reevaluated to determine specific recovery goals that would allow for reclassification and eventual delisting. The current and future colonies should be monitored regularly for a sufficiently long time (perhaps 3 to 5 years) to estimate their chances for long-term survival as self-sustaining populations. Because of its limited potential range, however, the Lotis blue butterfly may always be vulnerable.

Patuxent Wildlife Research Center in Maryland to augment the captive breeding flock.

The recovery of a previously stocked juvenile Colorado squawfish (*Ptychocheilus lucius*) from Arizona's Salt River by FWS and Arizona Game and Fish Department biologists marks the first time in over 30 years that the species has survived in that river. The 6-inch fish was the first to be recovered from the Salt River as the result of a stocking program initiated last fall under the "experimental" population designation. The fish was stocked as a 2- to 3-inch fingerling in September 1985, along with 23,300 other fingerlings, for part of a 10-year reintroduction program designed to reestablish the species in the rivers of the lower Colorado River basin. Over 300 adult squawfish were stocked into the Verde River at the same time; to date, 12 of those have been recaptured.

Regional Briefs

(continued from page 2)

collection trip in the last 3 years are as follows:

Year	Average Number of Shortnose Suckers	Average Number of Lost River Suckers
1984	17.3	56
1985	11.5	43
1986	3.0	29

A third Category-2 candidate species, the Klamath largescale sucker (*Catostomus snyderi*), also is declining.

Spawning runs this year were very early and brief. By the end of April, fisheries biologists had captured only 10 shortnose suckers. These declines are particularly distressing when the long-lived nature (up to 20 years) of the fish is considered. The observed declines greatly exceed what might be expected from natural mortality. An emergency ESA listing is being considered.

Cui-ui (*Chasmistes cujus*) are off and running on their annual spawning trek up the Truckee River. As of the end of April, Great Basin Complex personnel and several volunteers had helped 29,959 cui-ui over Marble Bluff Dam. Since the construction of the dam, cui-ui runs have begun between late April and mid-May. This year, for some undetermined reason, the run began on March 28. Within a matter of days, the run increased from one or two fish per day to a peak of 5,400 fish on April 10. The run gradually decreased to only a hundred or so fish per day by early May.

Pyramid Lake cutthroat trout are once again ascending the Truckee River, a world class trout stream. As of June 4, FWS personnel have helped more than 1,400 Lahontan cutthroat trout (*Salmo clarki henshawi*), many in the 6-8 pound class, over Marble Bluff Dam. This is the

largest trout run in the fish facility's history. These fish will be able to reach some of their historical spawning areas near the California State line and contribute to the off-reservation sport fishery.

Endangered species biologists continued efforts to assist Nevada's Lund Irrigation District in its management of irrigation water from springs that are designated as Critical Habitat for the White River spinedace (*Lepidomeda albivallis*). In cooperation with the Nevada Department of Wildlife, a survey was conducted in Lund Springs and its outflow to determine the distribution of spinedace in this area; however, no spinedace were seen. The survey included the areas that the fish occupied last summer. Additional surveys will be conducted this summer to determine the status and distribution of this population. The Lund Irrigation District representatives have requested the FWS to prepare a management plan for the species by this fall that is compatible with their use of water from its habitat.

The Honolulu, Hawaii, Field Office assisted in the inspection of the ongoing construction of the State's Olinda Endangered Species Propagation Facility on Maui. The U.S. Army is constructing two large units to house captive Hawaiian crows or 'alalas (*Corvus hawaiiensis*). Although heavy rains during March and April have delayed construction efforts, work is now progressing well, and completion is expected by late July.

Region 2—Twenty-four whooping crane (*Grus americana*) eggs were picked up in Canada, where biologists found 27 nests. Several nests contained only a single egg. On May 27, 20 eggs were transferred to Gray's Lake National Wildlife Refuge (NWR) in Idaho for cross-fostering with wild sandhill cranes (*Grus canadensis*), and 4 were sent to

An abundance of adult caddis flies in the Parker, Arizona, area may be beneficial for extirpated Threatened and Endangered fishes. The Arizona Department of Health Services, the Bureau of Indian Affairs, and a State legislator have contacted the FWS regarding the nuisance caused by these non-biting flies and the potential use of native fishes to control them. Fingerling razor-back suckers (*Xyrauchen texanus*) were stocked into that portion of the Colorado River at the end of May. Use of Endangered bonytail chubs (*Gila elegans*) will also be considered, depending upon additional coordination with State and Federal agencies. All parties concerned felt that the use of a biological control (fish) was more acceptable than chemical control.

During the 1986 whelping season, the Endangered red wolf (*Canis rufus*) captive breeding program produced three litters totaling 20 pups, and the Endangered Mexican wolf (*Canis lupus baileyi*) captive breeding program produced one litter of 7 pups. Sixteen of the red wolf pups survived, bringing the captive red wolf population to its current high of 80 animals distributed among 7 facilities. Six of the Mexican wolf pups survived, bringing the captive population of this gray wolf subspecies to 33 animals distributed among 3 facilities. A second Mexican wolf litter was anticipated; however, the mother and all three of her pups died during birth. Efforts are under way to increase the number of participating facilities in each program in order to expand the total population, and ultimately to reestablish the animals in the wild.

Four pairs of adult red wolves are proposed to be moved to the Alligator River NWR in North Carolina next fall for rees-

(continued on next page)

Regional Briefs

(continued from previous page)

tablishment in the wild the following spring.

Plant surveys in Texas have resulted in the discovery of populations of the Mathis spiderling (*Boerhavia mathisiana*), a Category-1 listing candidate plant, near Mathis, Texas. For a while, it was suggested that the spiderling may have been lost due to the demand for the caliche soils (a type of soil cemented by calcium carbonate) upon which it depends. Another survey located a few blooming large-fruited sand verbena (*Abronia macrocarpa*), also a Category-1 candidate, near College Station, Texas. Both species are scheduled to be proposed for ESA listing this year.

Preliminary results of the reintroduction of Knowlton's cactus (*Pediocactus knowltonii*) appear very good. An early May inventory of the newly established (fall 1983) population found all 105 of the individuals to be alive, and most of them were in excellent condition. Data on flowering and fruit set also were collected. Forty-five additional cacti were planted in mid-May to compare with the success of fall planting. The New Mexico Natural Resources Department will continue to monitor this new population, as well as the only known wild population, for ecological and population biology information.

Region 3—Gone for a quarter of a century, peregrine falcons are back on the Mississippi River bluffs of Minnesota and Wisconsin. On Saturday, April 26, a dozen Minnesota falconers staked out cliffs along the Mississippi River to monitor the birds. Five peregrines, including a pair, were found living on four cliffs, two in Wisconsin and two in Minnesota. Another three peregrines were reported at Weaver Dunes (MN), and two were reported in the Minneapolis area.

On April 25, a peregrine was sighted from inside a window of Region 3's Federal Building at a distance of about 20 feet. The bird apparently had landed on the roof, where the General Services Administration has installed a nest box.

On May 6, FWS representatives met with Bureau of Land Management and Wisconsin Department of Natural Resources personnel to discuss how oil and gas leases in Wisconsin will be handled with regard to Threatened and Endangered species. Nearly 150 lease applications have been received to date, with a number of them having the potential to affect wolves, bald eagles, and some State-listed species. The three agencies agreed on adequate safeguards for the listed species. These safeguards will be incorporated into a

Memorandum of Understanding that will also define the role of each agency in ensuring the compatibility of exploration leases and conservation of listed species.

Last year in Michigan, a pair of bald eagles built a nest in a tree within the median strip of Interstate 27. To prevent a traffic hazard, a cone was placed over the nest this spring to discourage its use, and two nesting platforms were constructed a short distance from the highway. The eagles have built a nest near one of the platforms and are using that platform as a sunning deck.

The first Kirtland's warbler (*Dendroica kirtlandii*) was heard at the breeding grounds in Michigan on May 7. It is expected that the Mack Lake Burn Area will attract breeding pairs for the first time this year. Vegetation studies have already begun there, and it is hoped that color-banding of warblers can begin this summer to provide data on site fidelity and dispersal. The annual Kirtland's warbler census was scheduled for June.

A meeting in May of the Higgin's Eye Pearly Mussel Recovery Team generated two immediate tasks: (1) to develop a preferred habitat description for use in ESA Section 7 consultations and (2) to review recent *Lampsilis higginsii* data and determine if any sites should be added to the essential habitat list.

Region 4—While conducting a study to determine the impact of surface mining on the flattened musk turtle (*Stenotherus depressus*) in Alabama, Dr. C. Kenneth Dodd, Jr., of the FWS Denver Wildlife Research Center station in Gainesville, Florida, discovered a disease problem in the best population. Almost one-fourth of the turtles caught in the last trap sample at the site were affected, and one-half of the turtles found basking were diseased. Pneumonia is thought to be the ailment; however, the Jackson, Mississippi, Endangered Species Field Station is contracting with the FWS Division of Research to allow Dr. Dodd to investigate and verify the disease, its magnitude, and cause.

The Jacksonville Endangered Species Field Station has contracted with the Florida Cooperative Fish and Wildlife Research Unit at the University of Florida in Gainesville to survey the status of nine species, seven mammals and two birds, that are endemic to Florida and Georgia. The data from the survey will be used to evaluate whether these species, now classified as listing candidates, qualify for listing proposals under the ESA.

Three of the mammals, the Anastasia Island mole (*Scalopus aquaticus anastasiae*), the Anastasia Island cotton

mouse (*Peromyscus gossypinus anastasiae*), and the Anastasia Island beach mouse (*Peromyscus polionotus phasma*), occur only on the Atlantic Islands and barrier beaches of southern Georgia and northern Florida. Four of the mammals, the Micco cottontail rabbit (*Sylvilagus floridanus ammophilus*), the Micco cotton rat (*Sigmodon hispidus littoralis*), the Southeast beach mouse (*Peromyscus polionotus niveiventris*), and Goff's pocket gopher (*Geomys pinetis goffi*), have been reported from the vicinity of Micco in Brevard County, on the east central coast of Florida. The two birds to be surveyed are the Smyrna seaside sparrow (*Ammodramus maritima pelonota*), which occurs on the east coast of Florida from Amelia Island to New Smyrna Beach, and the Wakulla seaside sparrow (*Ammodramus maritima junicola*), which is known from the Florida gulf coastal marshes from Taylor County to at least Franklin County.

In 1901, John Kunkel Small collected specimens of a dwarf palmetto in the pinelands of Coconut Grove, now part of Miami, Florida. Small was unsure about the taxonomic status of these plants, which are similar to both the scrub palmetto (*Sabal etonia*) and the cabbage palm (*Sabal palmetto*). In late 1985, Scott Zona published a solution to Small's uncertainty, naming the large-fruited dwarf palmetto of the Miami pinelands *Sabal miamiensis*.

The new species description was based on a limited number of herbarium specimens and only a few living plants. The former geographic range and habitat of this palmetto largely coincide with those of five Miami pine and rockland plants that were listed as Endangered or Threatened species in 1985. Data collected to assess the status of these species illustrate that little native vegetation remains in the Miami and Fort Lauderdale urban areas. The Jacksonville, Florida, Endangered Species Field Station is preparing a proposal to add this palmetto to the list of Endangered species.

Amphianthus pusillus and *Isoetes tegetiformans* are Category-2 plant listing candidates that are restricted to vernal pools on granite outcrops in the Piedmont physiographic region of the Southeast. *A. pusillus* is known from Georgia, Alabama, and South Carolina, while *I. tegetiformans* is endemic to Georgia. During March 1986, the Jackson, Mississippi, Endangered Species Field Office botanist visited most of the known sites for these species. Most granite outcrops are threatened by quarrying, off-road vehicle use, and trash dumping. These activities have destroyed or severely impacted many populations, and status reviews are

(continued on next page)



photo by Jim Williams

Biologists used snorkeling and other methods in their recent search for the critically Endangered Maryland darter.

under way to determine if ESA listing proposals are warranted. *

Region 5—The Northern Flying Squirrel Recovery Team held its second meeting May 14 and 15 in Staunton, Virginia. Non-game program personnel in Virginia and West Virginia are putting up nest boxes and conducting limited live-trapping in spruce/northern hardwood habitat in an effort to learn more about the two Endangered squirrels' (*Glaucomys sabrinus fuscus* and *G. s. coloratus*) distribution. These States and North Carolina plan to conduct a cooperative, in-depth study of the squirrels' life history and ecology. *

On May 16, biologists from the FWS Washington Office of Endangered Species, Maryland Department of Natural Resources, and FWS Annapolis Endangered Species Field Station confirmed the existence of the Maryland darter (*Etheostoma sellare*) at its only known

recent location, a single riffle in Deer Creek, Harford County, Maryland. This highly Endangered fish, which was observed by one of the biologists while snorkeling, had not been seen since September 1983. The sighting was especially good news, in light of the sizeable spill of liquid manure that occurred upstream of the darter site last August.

On May 23, FWS representatives met with Maryland Natural Heritage Program personnel to plan projects for the protection and recovery of the Maryland darter. Projects include additional surveys for new populations, landowner education programs, and mapping pollution sources and land-use patterns along Deer Creek. *

Six Delmarva Peninsula fox squirrels (*Sciurus niger cinereus*) from Maryland were released at Prime Hook National Wildlife Refuge in Delaware on May 30. This is the second of three releases as part of a recovery effort to restore popu-

lations of the squirrel to the State of Delaware. *

Surveys to determine the number of nesting pairs of piping plovers (*Charadrius melodus*) are under way along the Atlantic coast. A storm tide in mid-May washed out many plover nests from Maine to Virginia. These birds often nest on beaches that are subject to washover by high tides, and nests are frequently lost.

Adult plovers will reneest; however, second nesting efforts will coincide with the time of highest public use of its nesting habitat. Human disturbance of nesting birds is the major reason for the piping plovers' population decline along the east coast.

An information brochure and color poster describing threats to the piping plover and explaining how the public can protect the species is available from the regional office (address on page 2 of the BULLETIN).

Black-footed Ferret Workshop

A "Workshop on Reproductive Biology of Black-footed Ferrets and Small Population Biology as They Relate to Conservation" will be held August 13-15, 1986, at the University of Wyoming in Laramie. The workshop, sponsored by the University, the Wyoming Game and Fish Department, and the U.S. Fish and Wildlife Service, is open for attendance to all interested persons. For further information, contact Conferences and Institutes, P.O. Box 3972, University Station, Laramie, Wyoming 82071-3972; telephone 307/766-2124. Registration before August 1 is encouraged.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313/763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	60	16	141	3	2	0	222	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	96	6	1	24	3	2	132	46
TOTAL	270	52	466	74	13	37	912	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 24 animals
42 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

May 31, 1986

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works only for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service will not deliver it.

June 1986

Vol. XI No. 6

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Audubon's Crested Caracara, One of Florida's Most Distinctive Raptors, Proposed for Listing

John L. Paradiso
Jacksonville, Florida,
Endangered Species Field Station

The Florida population of Audubon's crested caracara (*Polyborus plancus audubonii*), one of America's most unusual birds of prey, was proposed for listing as a Threatened species on June 23, 1986. This bird, also known as the caracara eagle, the Mexican eagle, and the Mexican buzzard, is a large raptor measuring nearly 2 feet in total length with a wingspread of about 4 feet. It has yellow legs that are very long for a hawk, and a massive blue bill. There is a prominent yellow or orange colored bare skin patch between the eyes and the base of the beak. The common name "crested caracara" refers to the long feathers on the back of the head that form a crest.

Adult caracaras are mostly dark brown and black, but the lower parts of the head, throat, lower abdomen, and undertail coverts are white, sometimes tinged with yellow. The breast and upper back also are white, although heavily barred with black, and the tail is white with narrow dark crossbars and a broad, dark tip. A distinctive feature of the caracara in flight is a prominent white patch on the outer part of the wing at the base of the primary feathers. Juveniles are similar in color pattern to adults, but are brownish and buffy, with the breast and upper back streaked instead of barred.

There is no other American bird of prey like the caracara; it combines some of the characteristics of both hawks and vultures, feeding with equal relish on carrion and living prey. Its striking appearance makes it most desirable to bird watchers wherever it occurs.

Caracaras as a group are found mostly in Central and South America. The crested caracara is the only species of this group that ranges into the United States. It occurs from Panama, north through Central America and Mexico, to extreme southern Arizona and Texas. Isolated populations are found in Cuba (including the Isle of Pines) and peninsular Florida. The crested caracara is the

(continued on page 4)



Florida's crested caracaras were first discovered by John James Audubon in 1831, a time when the birds were common residents of the open grassland prairie region of central Florida.

photo by John Waters, Jr., Florida Game and Fresh Water Fish Commission



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of June:

Region 1—The Boise, Idaho, Field Office reported that, during surveys for MacFarlane's four-o'clock (*Mirabilis*

macfarlanei) conducted in Idaho and Oregon, one of the largest populations (possibly the largest) of the plant was located. It was found close to the previously identified population near Tryon Bar on the Snake River.

U.S. Fish and Wildlife Service Washington, D.C. 20240

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U.S. Fish and Wildlife Service Regions

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The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240

The Great Basin Complex at Reno, Nevada, reported that the cui-ui (*Chasmistes cujus*) run is over for this year. About 36,500 adults ascended the Truckee River. Larvae produced from this run began emerging from the gravel in early May, and peak emigration occurred in mid-May. Complex personnel will continue to monitor larvae numbers to determine whether the spawning run's success will produce a large year class through late July.

A brief status survey of Condor Canyon in southeastern Nevada, Critical Habitat for the Threatened Big Spring spinedace (*Lepidomeda mollispinis pratensis*), was conducted cooperatively with Nevada Department of Wildlife personnel. Spinedace were found in low numbers throughout the area except for one site where several hundred adults were present. Rainbow trout and crayfish, which are potential competitors, were recently introduced into the system, and many crayfish were collected in the latest survey. A site for a potential spinedace introduction was identified on Clover Creek. Information from the trip will be utilized in the recovery plan for the Big Spring spinedace now being prepared.

The Sacramento, California, Endangered Species Office (SESO) staff and a select group of lepidopterists reviewed the taxonomic status of the Santa Cruz County populations of *Euphilotes enoptes*. The general consensus of this review was that the Santa Cruz specimens represented a blend, or intergrade, between the Smith's blue butterfly (*E. e. smithi*) and the Tilden's blue butterfly (*E. e. tildeni*). On the basis of this new information, the county was advised that we now consider these butterflies to be an intergrade population that is not protected by the Endangered Species Act.

The County of Sacramento recently announced the purchase of approximately 430 acres of private land within the American River Parkway. Portions of the property contain habitat for the Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Plans for the new acquisition include maintenance of existing habitats and reclamation of existing agricultural lands for the beetle's riparian habitat. Various local, State, and Federal funds were used to purchase the land.

The SESO, Environmental Protection Agency, San Mateo County Agricultural Commissioner, and San Mateo Farm Bureau reviewed the possible impacts to listed species by use of Mesurol (methiocarb) on artichokes for snail control. Because Mesurol is highly toxic to birds

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Endangered Classification Proposed for Southwestern Fish

PUBLIC DOCUMENTS
DEPOSITORY ITEM

AUG 26 1986

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The Virgin River chub (*Gila robusta seminuda*), once common, now is considered the rarest native fish in the Virgin River of southwest Utah, northwest Arizona, and southeast Nevada. Widespread modification of its unique habitat is responsible for the subspecies' serious decline in numbers and range. Further changes in its natural habitat, together with the potential spread of non-native species, threaten the chub's continued survival. To prevent its extinction, the Fish and Wildlife Service (FWS) has proposed listing this fish as Endangered (F.R. 6/24/86).

The Virgin River chub is adapted to swift waters that historically were naturally high in salinity, temperature, and turbidity, and that experienced fluctuating flows. These harsh environmental conditions probably account, at least in most part, for the fact that non-native predatory or competing fishes are not currently the problem in the Virgin River that they are in many other western river systems. Any actions that would alter these extreme water conditions could promote invasions of exotic species, further endangering the native fauna.

Since the mid-1800's, there has been an ever-increasing demand for development and use of the Virgin River and its tributaries. Five major water diversion structures built for irrigation and other agricultural uses now remove virtually all flows from long stretches of the Virgin River during summer. This severe

flow depletion has had obvious effects on the chub's habitat. Further, because Washington County, Utah, is experiencing a rapid increase in its human population, there will be a corresponding increase in demand for Virgin River water. Proposed desalinization projects and additional impoundments could further reduce the aquatic habitat or alter the water characteristics that now block the spread of harmful exotic fishes.

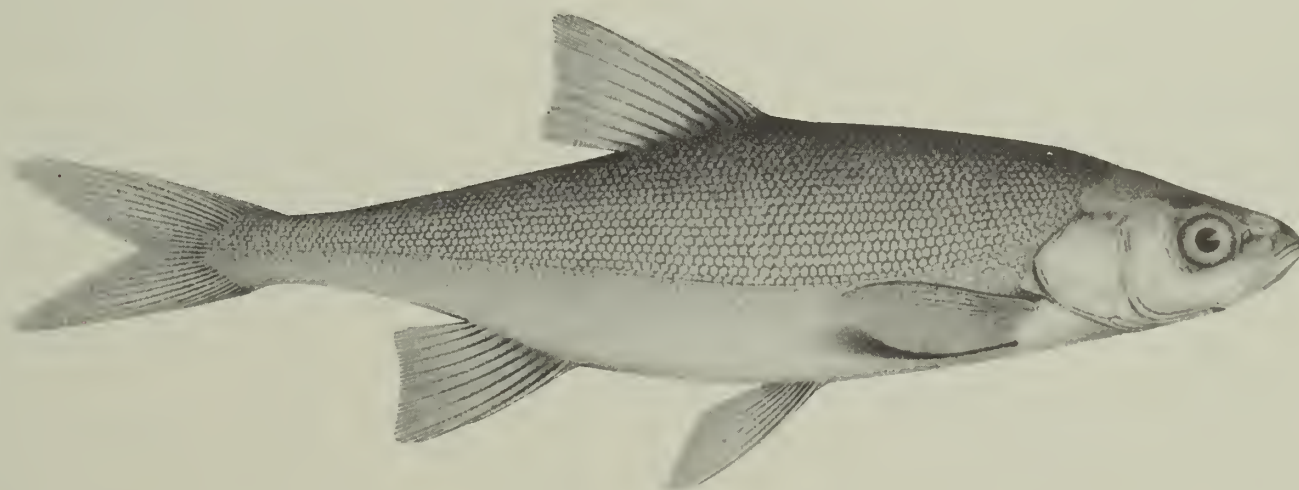
The only self-sustaining populations of the Virgin River chub known to survive are in 2 separate stretches of river totalling about 50 miles (80 kilometers). One occurs from a dam near Mesquite, Nevada, upstream to the southern end of the Virgin River Narrows. The second is found between the northern end of the Narrows and the Utah State Highway 9 bridge north of Hurricane, Utah. A provision to designate these 50 river miles as Critical Habitat was included in the proposed listing rule. Land along the occupied stretches is administered by the Bureau of Land Management (BLM), the States of Utah and Arizona, and private landowners. Several potential Bureau of Reclamation water development projects have been authorized for the Virgin River system, although they are not currently considered viable. In addition, the Soil Conservation Service (U.S. Department of Agriculture) has several projects proposed for the Virgin River basin in Utah. It is unknown at this time

whether or not any of these proposed projects would further jeopardize the chub.

If the proposed listing of the Virgin River chub and designate its Critical Habitat is approved, this fish will receive the full protection authorized under the Endangered Species Act. Among the available conservation measures are prohibitions on taking and trafficking in listed species, a requirement for the FWS to develop and implement a recovery plan, and the possibility of Federal grants to State wildlife departments that have signed Endangered Species Cooperative Agreements with the FWS. Arizona, Nevada, and Utah all have such agreements for listed animals.

One of the most important benefits of the listing rule, if approved, would be the requirement under Section 7 of the Endangered Species Act for all Federal agencies to ensure that none of their activities are likely to jeopardize the Virgin River chub's survival or adversely modify its Critical Habitat. If any agency were to find that one of its planned activities may affect the chub, that agency would be required to consult with the FWS. The FWS would then work with the agency in an effort to accommodate its goals while ensuring the species' conservation.

Comments on the proposed rule are welcome, and should be sent to the Regional Director, Region 2 (address on BULLETIN page 2), by August 25, 1986.



The Virgin River chub, *Gila robusta seminuda*, is a silvery, medium-sized minnow generally less than 6 inches (15 centimeters) in total length.

Caracara

(continued from page 1)

national bird of Mexico, and is depicted on that country's seal and currency.

Although crested caracaras are strong fliers and can reach speeds of up to 40 miles per hour, they are more at home on the ground than most hawks and falcons. Their long legs and relatively flat claws make them well-adapted for walking and running. They spend a considerable amount of time perched on telephone poles, fence posts, or other high vantage points where they can watch for the insects, fish, frogs, turtles, birds and small mammals that comprise a large part of their diet. Caracaras are also particularly fond of turtle eggs.

Caracaras hunt both on the wing and on the ground. A pair will sometimes cooperate in killing larger animals, such as rabbits or egrets. Road kills comprise a large part of the caracara's diet, and birds may regularly patrol sections of highways searching for dead animals. Caracaras feed freely with vultures, the two species paying little attention to each other. When caracaras and vultures gather at a carcass to feed, the caracaras easily dominate the vultures despite their smaller size. Caracaras have even been seen driving bald eagles from road-killed animals.

A pair of adult caracaras maintains a large territory, and pair bonds are strong, persisting until one mate dies. Their nests, commonly placed 12 to 55 feet above the ground in the top of cabbage palmettos, are tough, bulky structures made of weeds, bushes, and vines piled in a heap and trampled down to form a depression. Caracara eggs, one to four per nest, most often are laid from January to March, but they have also been found during every month from September to April. Incubation usually lasts 32 to 33 days, and the young leave the nest about 2 months after hatching. The family group remains together for 2 to 3 months after the young fledge.

Threats to the Species

John James Audubon first discovered Florida's crested caracaras near St. Augustine (where the subspecies no longer occurs) in 1831. The bird formerly was common in the open grassland prairie region of central Florida, north to Brevard County and south to Fort Pierce, Lake Okeechobee, Rocky Lake (Hendry County), the Okaloosa Slough, and the Everglades (Collier County). All indications are that the range of the caracara in Florida has experienced a long-term contraction, with the birds rarely found today as far north as Orlando or on the east side of the St. Johns River. Currently, the region of greatest abundance is the five-



The crested caracara, also known as the Mexican eagle, is on that country's national seal.

county area of Glades, DeSoto, Highlands, Okeechobee, and Osceola, with lesser numbers occurring in Charlotte, Hardee, and Polk Counties. It is believed there may be only 150 active territories (300 adults) remaining in all of Florida, and there are probably only another 100 immature birds present in any given year.

The major cause of the caracara's decline in Florida is habitat loss. Available habitat has greatly decreased, and continues to decrease as native prairies and pasturelands are lost to real estate and agricultural developments. Although the Migratory Bird Treaty Act and Florida State laws offer some protection against taking the caracara, it is still being shot or trapped because of the erroneous belief that these birds are predators on newborn calves and because their large size and impressive appearance make them tempting targets for vandals. The increase in automobile traffic in areas of the caracara's habitat is another threat, most probably due to the caracara's predilection for feeding on or along roads.

Although the FWS believes that protection of the caracara is necessary to prevent its extinction, designation of Critical Habitat in this case would not be prudent. A determination of this kind would necessitate delineating the precise boundaries occupied by each pair of birds. Not only are data lacking for these delineations, but publication of habitat maps (required for a Critical Habitat designation) could further jeopardize the caracara's existence by point-

ing out exactly where the birds occur. The presence of large numbers of people could inadvertently interfere with the caracara's normal activities; precise locality data also would make the birds more vulnerable to vandals.

Even without a Critical Habitat designation, listing the caracara under the Endangered Species Act would reinforce existing protection for the bird and add Section 7 protection for its habitat. The Act also would require the FWS to develop and implement a recovery plan.

The only known potential Federal activity that could be affected by this proposed listing is operation of the U.S. Air Force's Avon Park Bombing Range in Polk and Highlands Counties, an area that is part of the caracara's primary range. Although bombing range personnel recently reported no nesting pairs there at present, it is possible that caracaras may reside there at any time. With the publication of the proposed rule, the Air Force is now required to confer informally with the FWS if any of its bombing range activities are likely to jeopardize the caracara's survival. The FWS will work closely with the Air Force in an effort to help accommodate facility operations while avoiding further harm to the caracara.

Comments on the proposal to list the Florida population of Audubon's crested caracara are welcome, and should be sent to the U.S. Fish and Wildlife Service, Jacksonville Endangered Species Field Station, 2747 Art Museum Drive, Jacksonville, Florida 32207, by August 22, 1986.

Endangered Fish Recovery Activities in the Upper Colorado River Basin

John Hamill and Beth Hardy
FWS Denver Regional Office

Three fish species that inhabit the Upper Colorado River Basin are federally listed as Endangered—the Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*). A fourth, the razorback sucker (*Xyrauchen texanus*), is not listed at this time but is a candidate for future listing.

The following interagency agreements have been developed in recent months between the Fish and Wildlife Service (FWS) and the Bureau of Reclamation (BR) for studies regarding these fishes of the Upper Basin:

1. Flaming Gorge Endangered Fish Operation Study

Since 1979, the BR and FWS have consulted on various projects, including the

operation of Flaming Gorge Dam in southeastern Wyoming and its effects on the Endangered fish species of the Green and Colorado River systems. The lack of specific information on these fishes in the late 1970's prompted establishment of the Colorado River Fishery Project, which was principally funded by the BR and conducted by the FWS.

Studies began in 1979 under various agreements between the BR and FWS. Early investigations were directed toward determining the species' distribution and water flow requirements, and obtaining enough information for the FWS to render sound Section 7 biological opinions on various BR projects. It is becoming increasingly apparent from the results that proper operation of Flaming Gorge Dam is critical to the survival of Endangered fish in the Green River system.

Further studies will look into the summer and fall requirements of Colo-

rado squawfish in the Green River with respect to spawning and survival of young-of-the-year fish; characterization of winter habitat and flows for adult and young Colorado squawfish and adult razorback suckers; spring to early summer flow requirements of Colorado squawfish, humpback chubs, and razorback suckers; fish community interactions (competition between native and non-native species); and trophic dynamics and ecological interactions of important backwater habitats in the Green River. Other studies on the Green River will focus on water temperatures; channel stability and sediment transport (as influenced by Flaming Gorge Dam) down to the confluence with the Colorado River; and remote sensing and mapping of important backwater habitats of Endangered fishes.

Once the necessary information is gathered, the FWS will develop a biolog-

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photo by John Hamill

Endangered fish monitoring work on the Green River in Utah

UPPER
COLORADO RIVER
BASIN



Upper Colorado

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ical opinion on the continued operation of Flaming Gorge Dam by the BR. The opinion is scheduled to be issued in 1989.

2. Basinwide Monitoring and Research Agreement

The purpose of this agreement is to implement monitoring, research, and recovery activities for Endangered fishes throughout the Upper Basin. Necessary studies will be conducted by the FWS, BR, States of Colorado and Utah, and contractors. There are various timetables, but all of the work should be completed in 1988. Among the activities to be carried out under the agreement are:

2.a. Interagency standardized monitoring program—The objectives of this program include (1) determining the status and trends in Endangered fish populations in the Upper Basin; (2) determining relationships between physical and biological factors (e.g., flows, temperatures, non-native species, etc.) and the relative abundance of

Endangered fish; (3) ensuring that all data are properly collected and processed; and (4) monitoring the response of Endangered fish populations to different management and recovery measures. A handbook will be developed that defines standardized methods, sample designs, sampling sites, etc., for monitoring young-of-the-year Colorado squawfish, late juvenile/adult Colorado squawfish, and adult humpback chubs. The field program will be carried out by the Utah Division of Wildlife Resources and the Colorado Division of Wildlife.

2. b. Data analysis and management program—This program is designed to (1) compile and analyze existing FWS, State, and other data; (2) ensure that Endangered fish data are available for proper distribution; (3) establish a clearing house and data management support center; (4) provide basinwide and reach-specific summaries of the status and trends of various life stages of Endangered fishes; and (5) develop quantitative recovery goals for listed fishes in the Upper Basin. A data base management system handbook will be developed; an interagency monitoring data base and data base management system will be developed and main-

tained; habitat utilization curves for the Endangered fish will be refined and validated; and technical support will be provided to field staff in use of the data management system.

2. c. Design, construction, and evaluation of fish passage facility on the Gunnison River at Redlands—The objectives of this program are to reestablish use of the Gunnison River by Colorado squawfish and razorback suckers by (1) constructing a fish passage structure at the existing Redlands Diversion Dam on the Gunnison River in western Colorado; (2) evaluating the structure's effectiveness as a means of restoring the Colorado squawfish and razorback suckers upstream of the dam; and (3) augmenting Endangered fish populations at Redlands through stocking. During 1986, a feasibility study will be conducted by the U.S. Army Corps of Engineers to evaluate alternative fish passage structures for adult Colorado squawfish and razorback suckers.

2. d. Hydrology modeling of the Upper Colorado River Basin—One objective of this effort is to accurately model mean monthly flow conditions at sensitive habitat areas throughout the Upper Basin in various water years and under different water development conditions. Another goal is to accurately model the effects of different operating criteria for Flaming Gorge and the Wayne Aspinall Units at sensitive habitat areas on the Green, Gunnison, and Colorado Rivers.

2. e. Temperature information and modeling on the Colorado River—Biologists will develop methods of accurately assessing temperature conditions in sensitive habitat areas in the Upper Basin, evaluate thermal impacts of alternative water management scenarios on Endangered fishes, and recommend operating criteria on water projects for Section 7 and recovery efforts.

2. f. Instream flow data collection and analysis—This activity is designed to (1) develop quantitative relationships

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humpback chub

Listing Becomes Final for Southeastern Plant

Scutellaria montana, the large-flowered skullcap, is a herbaceous member of the mint family (Lamiaceae) that reaches 12 to 22 inches (30 to 55 centimeters) in height and has attractive blue and white flowers. Only 10 populations have been found, 7 in Georgia and 3 in Tennessee. Fewer than 7,000 of the plants are known to exist, and over 90 percent are concentrated at only two sites. Although portions of these two largest populations receive landowner protection, the species' survival in the face of continuing threats to its habitat

remains in question. A proposal by the FWS to list *S. montana* as Endangered was published November 13, 1985 (see summary in BULLETIN Vol. X No. 12), and the final listing was published June 20, 1986.

Under the Endangered Species Act, it is now illegal to engage in interstate or international trafficking in *S. montana*, except under permit. Other benefits include the requirement for the FWS to develop and implement a recovery plan, greater recognition of the species' precarious status, and the possibility of

Federal aid to States with approved Endangered Species Cooperative Agreements with the FWS under Section 6 of the Act. (Georgia, where the species' second largest population is found, is among those States with such an agreement for listed plants.) Under Section 7 of the Act, *S. montana* also will receive protection from any Federal activities that are likely to jeopardize its survival; fortunately, no such activities are foreseen.

Alligator Being Considered for Rangewide Reclassification

Wendell A. Neal
Jackson, Mississippi, Field Office

The FWS proposed June 2, 1986, to reclassify the American alligator (*Alligator mississippiensis*) where it now is categorized as Endangered or Threatened to the category of Threatened by Similarity of Appearance (T/SA). From a species-wide standpoint, the alligator is no longer in danger of extinction, nor is it likely to become so within the foreseeable future. Reclassification of this reptile to T/SA would formally recognize that this species has recovered, and allow some hunting while continuing certain trade controls designed to protect other, more vulnerable crocodilians.

Populations in most areas occupied by alligators (approximately 83 percent of this species' total range) already have been reclassified to T/SA in Florida, Louisiana, and Texas. The June 2 proposal would reclassify the remaining populations, scattered over parts of seven States (North Carolina, South Carolina, Georgia, Alabama, Arkansas, Mississippi, and Oklahoma), to T/SA. If the rule is made final, all populations of the American alligator would be classified as T/SA.

It is believed that this reclassification proposal will be the last in a long series of Federal rule changes under the Endangered Species Act affecting the American alligator. The alligator was

first classified in 1967 as Endangered due to concern over poorly regulated or unregulated exploitation for the hide industry. Under State and Federal protection, the alligator then began to recover in most parts of its range. By 1975, alligator populations in three Louisiana coastal parishes were large enough to be moved from the Endangered and Threatened classifications to the T/SA category. Alligator populations in all of Louisiana, Texas, and Florida later received the same T/SA classification.

Legal commercial hunting seasons for alligators are now held in these three States. Through initial harvesting programs, much has been learned about the effects of hunting on alligator populations. For example, past harvests of alligators were more often than not permitted without any realistic estimate of pre-harvest numbers or without any post-harvest monitoring to determine limits or restrictions needed to protect the main breeding group. Today, however, with data gathered in recent years by the Florida Game and Fresh Water Fish Commission and the Louisiana Department of Wildlife and Fisheries, we can establish some rough limits to hunting that will conserve wild alligator populations. With current knowledge and management techniques, past mistakes can be avoided, and overharvest should no longer be a threat.

Although the American alligator is no longer believed to be in danger of extinction, a number of other crocodilian species with hides of similar appearance remain very vulnerable. The category of T/SA, described in Section 4(e) of the Endangered Species Act, allows for Federal controls and monitoring in the trade of species thus classified in order to facilitate the protection of other species still listed as Endangered or Threatened.

The reclassification proposal, if approved, will remove the remaining 17 percent of the American alligator's range from habitat protection under Section 7 of the Endangered Species Act. Although wetlands within the species' range continue to be lost due to a variety of causes, such losses are not expected to significantly affect the overall alligator population. Further, Federal and State agencies manage and protect large amounts of alligator habitat. Overhunting, rather than habitat loss, was the main factor in the species' original decline.

Comments on the proposed reclassification are welcome, and should be sent to the Endangered Species Field Office, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by August 1, 1986.



photo by Kirke A. King

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and aquatic animal species, no-spray zones were recommended near the habitats of the Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), and Smith's blue butterfly.

The Washington Department of Game, U.S. Forest Service (USFS), and National Park Service (NPS) will cooperatively search for active peregrine falcon (*Falco peregrinus*) eyries on the Baker-Snoqualmie National Forest and North Cascade National Park. FWS contributed \$3,000 to conduct surveys in western Washington, and the USFS and NPS each contributed \$800 to survey their lands. The USFS will also provide technical assistance to survey peregrine falcon nests in Olympia National Forest.

A proposed housing development and golf course at Clatsop Plains, Clatsop County, Oregon, could impact a primary breeding area for the Threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*). The FWS notified the county and the developer of the likelihood of an illegal take if the project should proceed. The FWS, the developer, and the county reviewed options and project modifications, and the developer is considering preparation of a Habitat Conservation Plan for a Section 10(a) permit.

Region 2—The Arizona bald eagle (*Haliaeetus leucocephalus*) population has completed its second most successful breeding season known. Sixteen territories were active, with 12 sites fledging a total of 17 young. Twenty-two young were fledged from 13 nests in 1985. A newly discovered nesting territory fledged one young. In addition, two chicks were moved from a nest prior to its flooding and were placed in a nest that had failed to hatch its eggs. Both of the transferred chicks fledged successfully.

Thirty Endangered thick-billed parrots (*Rhynchopsitta pachyrhyncha*) were confiscated by FWS law enforcement agents after the parrots were illegally imported from Mexico. These birds, and another 10-15 thick-billed parrot chicks produced in captivity by various zoos and private breeders, are being considered for reintroduction into the wild. The Arizona Game and Fish Department, U.S. Forest Service, and FWS are cooperatively planning to reintroduce the birds into part of the species' former range in the mountains of southeastern Arizona this fall.

A male whooping crane (*Grus americana*) that was found dead in Canada's Wood Buffalo National Park in late May was necropsied by veterinarians at the University of Saskatchewan. Small spots of dead muscle were present on the bird's heart. Presumably the 8-year-old whooper died from cardiac arrest. Efforts are under way to determine the cause of the dead muscle.

Dr. James Lewis, FWS Whooping Crane Coordinator, met with the National Wildlife Health Laboratory staff to discuss the avian tuberculosis that infected three whooping cranes in the Rocky Mountain population last spring.

Of the 15 whooping crane eggs transferred to Grays Lake National Wildlife Refuge (NWR) in late May, eleven hatched, two were eaten by predators, and two were infertile. Of the four eggs transferred to Patuxent Wildlife Research Center in Maryland, two hatched and two died during embryo development.

On June 26, an adult female whooping crane was captured in western Wyoming. The bird, flightless due to the annual molt, was transported to Grays Lake NWR and released in the vicinity of two adult males. A second female will probably be moved to Grays Lake within the next few weeks. These transfers are designed to increase the opportunity for male-female associations that may eventually lead to pair bonds.

A meeting was held at the White Sands Missile Range in New Mexico to discuss drafting a management plan for the White Sands pupfish (*Cyprinodon tularosa*), a Category-2 listing candidate. The species is of interest to the FWS because it occurs only in three locations on the missile range and at one location on Holloman Air Force Base. Loss of any of the populations could seriously affect the survival of the species in its natural habitat; however, successful implementation of a management plan could provide protection for the species and its habitat.

There is great concern that the 1986 Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*) hatch may have been lost to the heavy rains that fell on the Attwater Prairie Chicken NWR in Texas between May 30 and June 18. At varied times, water flowed across the refuge prairie and roads. Refuge brood surveys will be conducted during July to determine the extent of damage to the hatch. The hatching success of the Attwater's prairie chickens along the Texas coast may also have been affected by recent heavy rains in that area.

The 1986 Attwater's prairie chicken population of 874 is down 39 percent from 1985. Biologists believe that the decline is largely due to the heavy rains

that occurred during the 1985 hatching period in the southern populations of Goliad, Refugio, and Victoria Counties, Texas. Habitat destruction has also contributed to this decline.

The Attwater's Prairie Chicken Recovery Plan recommends that a second wildlife refuge be established to help preserve this species. Planning is under way to develop a 15,000-acre refuge in Victoria County that would be operated as a satellite of the Attwater Prairie Chicken NWR.

Region 3—Landowner contacts continue by The Nature Conservancy on the "Driftless Area Project" in northeast Iowa. This is a joint effort by the FWS, The Nature Conservancy, and the Iowa Conservation Commission to protect algific slopes (areas with year-round frozen subsoil) containing the Endangered Iowa Pleistocene snail (*Discus macclintocki*) and Threatened northern wild monkshood (*Aconitum noveboracense*). The owners of 23 land parcels are to be contacted; so far, 17 have registered under the Conservancy's registry program. Registration is a voluntary commitment by a landowner to protect the algific slopes and is viewed as an interim measure until permanent protection is obtained. The excellent response to registration indicates an awareness and concern by the local citizens for resource protection.

On June 5, the Gray Wolf Recovery Team met in the Regional Office to discuss the Wisconsin Wolf Recovery Plan, road densities, management on the Superior National Forest, and effects of developing snowmobile trails on wolves.

The research project on the Kirtland's warbler (*Dendroica kirtlandii*) has been redirected from the winter work in the Bahama Islands to Michigan, specifically the Mack Lake burn area. The work in the Bahamas to date indicates that the birds are widely distributed with no apparent habitat problems.

The warbler census has been completed in Michigan. Two hundred ten singing males were found this year, including 14 on the Mack Lake area. No birds have been found in Ontario yet. Last year's census indicated 215 singing males, plus one in Ontario.

A meeting to discuss the extent and causes of a freshwater mussel die-off was held recently in Davenport, Iowa, with about 75 attendees from a broad range of State and Federal agencies. While reports on a number of "die-offs" were presented, there still are no clear data proving the occurrence of a widespread die-off from a single cause. Possible causes were discussed, as well as

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the type of study needed to identify a die-off and to identify the cause(s).

Region 4—Numerous arrests have been made in Georgia and South Carolina for the illegal commercialization of wildlife. In Georgia, a 20-month investigation, Operation PISCES, covered 27 counties and was conducted by conservation rangers from the State Department of Natural Resources and FWS law enforcement special agents. The undercover agents set up a storefront business to infiltrate the illegal market. More than 500 pounds of alligator meat, 2,000 pounds of deer meat, 2,500 pounds of raccoon meat, and 1,000 pounds of fish, including the Endangered shortnose sturgeon (*Acipenser brevirostrum*), were bought and sold during the operation. The gourmet food market supplied all of the business demand. Persons charged with the illegal sale of wildlife

may have been involved in interstate, intrastate, or even foreign commerce.

In South Carolina, 70 people were arrested in May for the illegal commercialization of deer, fish, gamebirds, and fur. State warrants and Federal indictments, involving 300 counts of conservation law violations, were served as a result of an undercover crackdown involving special agents of the South Carolina Wildlife and Marine Resources Department and the FWS.

The Jacksonville, Florida, Endangered Species Field Station staff has been involved over the last several weeks in the review of a red-cockaded woodpecker (*Picoides borealis*) management plan for a large tract of land near Orlando where the Martin Marietta Aerospace Corporation is proposing to develop an electro-optical test range. As a result of an Endangered species survey, six red-cockaded woodpecker colonies were found. Developing the test range will necessitate some tree removal, which will affect the foraging habitats of several colonies. The consultant has

prepared a management plan for the remaining area in order to enhance the survival of the clans impacted by this development.

Working with the applicant, the FWS also recommended some modifications in the design of the test range to accommodate the birds. The management plan calls for prescribed burning and some timber harvesting to open habitat that may not be useable by the birds at the present time. Up to several years ago, it was thought that there were very few red-cockaded woodpeckers remaining in Orange County. However, as private lands are being developed and wildlife surveys are being conducted, active clans are being located.

A significant tract of Florida land supporting pine rockland vegetation, a vanishing biological community, has come into public ownership in the Miami area. The Deering Estate, a 347-acre tract south of Coral Gables, contains about 75 acres of pine rocklands. A federally Endangered plant, *Euphorbia deltoidea*

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Operation PISCES uncovered widespread illegal trade in certain species of wildlife, including the Endangered shortnose sturgeon.

photo by Patrick McIntosh

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var. *deltoidea*, occurs on the site. The property was purchased through the State's Conservation and Recreational Lands Program and will be managed by the Metropolitan Dade County Parks and Recreation Department, which is currently negotiating a management plan with the Florida Department of Natural Resources.

A hydrology study, funded by Waste Management of North America, Inc., of the area near Key Cave (Alabama) was recently completed. The study was conducted to determine if a proposed solid waste landfill site fell within the recharge area for Key Cave. This cave contains the only known population of the Threatened Alabama cavefish (*Speoplatyrhinus poulsoni*).

The hydrologic investigation recommended that the proposed landfill site not be used for solid waste due to the risk to Alabama cavefish. Based on this report, Waste Management withdrew its permit application. A copy of the hydrologic report was provided to the Endangered Species Field Station at Jackson, Mississippi, and will be very beneficial in future efforts to protect and recover this species.

Region 7—Biological surveys are once again under way on Kiska Island in the Aleutians where this spring the toxicant Compound 1080 was used to try to rid the island of introduced arctic foxes (*Alopex lagopus*). This action is necessary to benefit the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*), which once was an abundant breeding bird on the island.

Although only a small section of Kiska has been surveyed to date, no foxes or fox signs were evident. A survey for bald eagles, conducted by circumnavigating the island by vessel, revealed that eagle numbers were virtually identical to those recorded last summer prior to the treatment. Survey efforts on other non-target wildlife species are continuing. Biologists were also pleasantly surprised to observe 16 Aleutian geese on the island. Although the birds appear to be non-breeders, they may be the vanguard of a future breeding population.

Region 8 (Research)—Two FWS research and development scientists, Richard C. Banks and Paul A. Opler, recently participated in a review panel for the bay checkerspot butterfly (*Euphydryas editha bayensis*). Opler, Chief of the Office of Information Transfer's Editorial Section, chaired the panel, which was asked to evaluate the taxonomic status and distribution of the butterfly. The panel concluded that the bay checkerspot is, in fact, a valid sub-

species that previously had been present in four California counties, and is now extirpated in two. Banks and Opler, together with two other FWS biologists, Michael Bentzien and Steven Chambers, received a special group award for their part in the panel.

On May 31, the Maui, Hawaii, Field Station staff of the Patuxent Wildlife Research Center (PWRC), made the first observation of fledging of the po'o uli (*Melamprosops phaeosoma*), an Endangered Hawaiian forest bird. One young fledged from the nest, located in the Hanawi watershed on Maui, and did not return to it. Observations of this nest, first discovered in March, represent the only information to date on the po'o uli. On June 1, the young bird was observed with its parent 30 meters from the nest site.

A Mississippi sandhill crane (*Grus canadensis pulla*) chick, taken as an egg from the wild on May 8, hatched five days later at PWRC in Maryland. As part of a research study, the chick is being reared under a mounted Florida sandhill crane (*G. c. pratensis*) brooder model and fed with a mounted crane head.

On May 21, a Mississippi sandhill crane egg produced by the PWRC captive-propagation flock was transported to the Mississippi Sandhill Crane National Wildlife Refuge near Gautier, Mississippi. It was immediately introduced into a wild nest where two eggs had failed to hatch. Refuge personnel reported that the translocated egg hatched on May 28.

A key member of the wild Puerto Rican parrot (*Amazona vittata*) population, an adult male, has not been sighted since mid-May, and researchers at the Puerto Rico Endangered Species Field Station fear that he is dead. This parrot was a member of the nesting pair that produced two clutches this year containing a total of seven eggs; six of these eggs hatched. Biologists continue to search for the missing parrot.

Currently, the wild population of the Puerto Rican parrot consists of a minimum of 28 birds, including 6 chicks in nests. The captive population at the Puerto Rico Field Station aviary includes 29 adult parrots, 6 chicks taken from natural nests in the wild, and 3 captive-produced chicks.

Eighteen wild-caught masked bobwhites (*Colinus virginianus ridgwayi*) from Mexico were released recently from the U.S. Department of Agriculture quarantine facility in New York and transferred to PWRC. These birds will be useful in increasing the genetic diversity of the captive masked bobwhite flock.

National Forum on BioDiversity

The National Academy of Sciences and the Smithsonian Institution will sponsor a National Forum on BioDiversity on September 21-24, 1986, in Washington, D.C. This forum will carefully examine the issue on a worldwide basis through a series of panel sessions, roundtable discussions, films, and lectures. Concurrent with the forum, the Smithsonian National Associates Lecture and Seminar Program will present an in-depth seminar on biological diversity during September 21-27. In addition to the forum events, seminar activities will include guided tours of the National Museum of Natural History and field trips to several Smithsonian research and conservation facilities. Both the forum and seminar are designed to provide participants with a better understanding of the severity and consequences of the destruction of the earth's natural environments. For a more detailed description of the programs, contact the National Forum on BioDiversity, Directorate of International Activities (SI 302), Smithsonian Institution, Washington, D.C. 20560. Advanced registration is highly recommended.

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

BULLETIN Available by Subscription

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Upper Colorado

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between flow and important habitats for Endangered fishes at sensitive habitat sites in the Upper Basin; and (2) relate changes in flow/habitat to changes in fish populations.

2. g. System maintenance, design, and software integration—The objectives include: (1) maintaining and providing user support for an efficient computer file management/archiving system; and (2) ensuring that the system is being used efficiently by all Upper Basin users.

3. Ruedi/Green Mountain Conservation Measures

A third agreement with the BR's Missouri River Region provides funding for the FWS to evaluate the feasibility of artificially spawning and rearing young Colorado squawfish in "grow-out" ponds adjacent to the Colorado River near Grand Junction, Colorado.

Studies by the FWS suggest that temperature may be an important factor limiting the growth of Colorado squawfish in the Upper Basin. Slow growth extends the period when young squawfish are vulnerable to predators and other dangers. Gravel-pit ponds in the Grand Valley area warm earlier in the year, and stay warm longer than does the adjacent Colorado River. This longer growing season, combined with the abundance of food planned for stocking in these ponds, should result in Colorado squawfish growth rates 4 or 5 times faster than those of squawfish in the river.

Adult Colorado squawfish will be captured during spawning surveys and the females brought into ripeness using hormone injections. Next, their eggs will be stripped and dried locally, then transported to Hotchkiss National Fish Hatchery for incubation, hatching, and

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	60	16	141	3	2	0	222	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	97	6	1	24	3	2	133	46
TOTAL	271	52	466	74	13	37	913	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 26 animals
42 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

June 30, 1986

early growth. The resulting fry, or other fry from Dexter National Fish Hatchery (if needed), will be stocked into ponds from which undesirable species have been removed. Growth and survival of the squawfish will be monitored, as will basic water chemistry and the status of the stocked forage-fish community. Fish produced will be used in high priority research areas, such as the Gunnison River, as part of the evaluation program for the proposed Redlands fish-passage structure.

This work plan is the first part of a three-phase effort to evaluate the potential for producing squawfish in grow-out ponds. Phase one will evaluate the feasi-

bility of using the ponds for fish production and maintenance of broodstock, the second involves overall production capability, and the third concerns evaluating the use of squawfish raised in grow-out ponds as an aid in augmenting and/or restoring the species in its natural river habitat.

For further information on any of the Upper Colorado River Basin fish recovery activities, contact John Hamill, Colorado River Endangered Species Recovery Coordinator, in the FWS Region 6 Endangered Species Office at (303) 236-7398 or FTS 776-7398. (See address on BULLETIN page 2.)

July 1986

Vol. XI No. 7

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
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Three Southeastern Animals Proposed for Listing

Three rare taxa found only in the southeastern United States—a freshwater turtle, a tortoise, and a fish—were proposed by the Fish and Wildlife Service (FWS) during July 1986 for listing as Threatened or Endangered. The primary threat to all three is habitat depletion or loss, although the two reptiles also are vulnerable to collecting and predation. If the listing proposals later become final, the protection authorized by the Endangered Species Act will be extended to the following:

Alabama Red-Bellied Turtle (*Pseudemys alabamensis*)

This herbivorous freshwater turtle is restricted to the lower floodplain of the Mobile River system in Baldwin and Mobile Counties, Alabama. It is a fairly large species, having an 8-10 inch (20-25 cm) carapace that is brown to olive in color, with yellow, orange, or reddish streaks and mottling that form distinct, vertical bars. Its skin is olive to black with yellow to light-orange stripes. Characteristics most useful in distinguishing this species from other members of its genus in the Southeast include the number and configuration of stripes on the head and arching of the shell.

The Alabama red-bellied turtle once was found as far north as Little River State Park in Monroe County, but it now occurs only as far north as the Mobile River below David Lake. Its principal habitat consists of dense beds of aquatic vegetation, which provide the turtle with food and substrate for basking and predator avoidance. There is only one known nesting area receiving repeated annual use, an island spoil bank bordered on

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Editor's Note

For budgetary reasons, BULLETIN Vol. XI Nos. 8 and 9 were delayed. They are combined in this edition.

Red Wolf Proposed for Reintroduction

The Fish and Wildlife Service (FWS) proposed July 24, 1986, to reintroduce mated pairs of red wolves (*Canis rufus*), an Endangered species, into the Alligator River National Wildlife Refuge in Dare and Tyrrell Counties, North Carolina, and to classify this population as a "nonessential experimental population" under Section 10(j) of the Endangered Species Act of 1973 (ESA). The red wolf has been extirpated from its entire historical range in the southeastern United States and exists only in captivity.

Experimental status is being proposed because it authorizes more management flexibility than is allowed for a regularly listed species. This provision is a critical factor in gaining support from other agencies and the public for the proposed reintroduction. An experimental population is treated as a Threatened species for purposes of Sections 4(d) and 9 of the ESA, which prohibit certain activities involving listed species.

The designation of nonessential was proposed because the red wolf is fully protected in captivity at seven different locations, and all animals released into the wild can be quickly replaced through captive breeding. When not on a National Wildlife Refuge or National Park, a nonessential experimental population is treated as a species *proposed* for listing, rather than as a listed species, for purposes of Section 7 of the ESA (except for Section 7(a)(1), which applies to all experimental populations). However, if the experimental population is located on a National Wildlife Refuge or National Park, the full protection of Section 7 applies. No conflicts are envisioned between reintroduced red wolves and any Federal actions or traditional public uses of the refuge or surrounding lands.

A special rule specifying circumstances under which take of reintroduced red wolves would be allowed was proposed

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The red wolf, now extinct in the wild, has been proposed for reintroduction into an area of North Carolina within its former range.

photo by Steven Schremp



Regional News

Endangered Species Program regional staffers have reported the following activities for the months of July and August:

Region 1—The Sacramento Endangered Species Office (SESO) verified a report by Robert Edminster, a Merced

(California) Junior College teacher, of delta coyote-thistle (*Eryngium racemosum*) occurring along the San Joaquin River. Four populations also were confirmed east of Kesterson National Wildlife Refuge (NWR). This plant is currently a Category-1 candidate for a future listing proposal.

U.S. Fish and Wildlife Service
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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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In response to the request of local developers, conservationists, and government officials, the Marina Coastal Zone Planning Task Force expressed an interest in preparing a Habitat Conservation Plan for coastal dune populations of the Endangered Smith's blue butterfly (*Euphilotes enoptes smithi*). The SESO has provided preliminary information about the procedures, time frames, technical requirements, costs, and other matters related to development of such conservation plans.

A very small population of the Travertine band-thigh diving beetle (*Hygrotus fontinalis*), a Category-2 listing candidate, was found in one pool of the Travertine Hot Springs in Mono County, California. The springs are being modified by recreational activities.

The FWS Laguna Niguel, California, Field Office investigated two more unauthorized fills in San Diego County. One involved clearing of riparian habitat that contained the nest of a least Bell's vireo (*Vireo bellii pusillus*), which occurred within proposed Critical Habitat for the species. Although a final rule was published on May 2, 1986, listing the vireo as Endangered, a decision on the designation of Critical Habitat has been postponed until May 3, 1987 (see BULLETIN Vol. XI No. 6). Both of these suspected illegal activities were reported to the Los Angeles District of the U.S. Army Corps of Engineers.

A cooperative survey of the Mariana fruit bat (*Pteropus mariannus mariannus*) on Ulithi Atoll and the islands of Yap, Gagil-Tamil, and Maap in Yap State (Federated States of Micronesia) was conducted to determine the status of the species there. The survey showed that these fruit bat populations are at the carrying capacities of their habitat. Pressure has been mounting in Yap State to abolish current restrictions on taking of fruit bats to supply export markets on Guam and Saipan. The fruit bat on Guam is Endangered, and the populations on the islands of Saipan, Tinian and Rota have been petitioned for listing as Endangered due to excessive taking for human consumption. The results and recommendations for management of this species were transmitted to the Governor of Yap State at his request. The Yap Government and the FWS are concerned that lifting the ban on taking fruit bats would have serious effects on the species.

The existing ban was prompted by drastic population declines resulting from excessive taking to supply fruit bats for the markets on Guam and Saipan. They were sold for \$20-25 each. The moratorium on taking has enabled the fruit

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Final Section 7 Regulations Approved

Nancy Sweeney
Endangered Species Office, Washington

On June 3, 1986, the Departments of Commerce and the Interior published joint final Interagency Cooperation Regulations implementing Section 7 of the Endangered Species Act (ESA). The previous Section 7 final regulations were published on January 4, 1978. Subsequently, the ESA was amended in 1978, 1979, and 1982. Proposed regulations that incorporated the changes mandated by the amendments were published on June 29, 1983. Numerous comments on the draft regulations were received from Federal, State, and local governments; industry; environmental groups; and private citizens.

Section 7 of the ESA requires Federal agencies, in consultation with and with the assistance of the Secretaries of Commerce and/or Interior, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a Threatened or Endangered species or result in the destruction or adverse modification of designated Critical Habitat. The consultation responsibilities have been delegated to the National Marine Fisheries Service for the Department of Commerce and to the Fish and Wildlife Service for the Department of the Interior.

The 1978 Amendments made four major changes in the previous consultation process. The first was the requirement that a biological assessment be conducted for certain actions. The new final regulations have limited this requirement

to major construction activities. The second change was that consultation is to be concluded within 90 days after initiation of consultation instead of 60 days; further, if the Service involved issues a biological opinion of jeopardy or adverse modification, it must include reasonable and prudent alternatives to the action, if any can be developed. The third change prohibits the Federal agency and the permit or license applicant, once consultation is initiated, from making any irreversible or irretrievable commitment of resources that would preclude the adoption of any reasonable and prudent alternatives. The fourth change was the creation of the exemption process. Through a Review Board and Endangered Species Committee, a Federal agency or permit applicant may seek an exemption to Section 7's requirement to ensure no jeopardy or adverse modification.

The 1979 Amendments added a provision whereby a Federal agency that has an action that is likely to jeopardize the continued existence of a *proposed* species or result in the destruction or adverse modification of *proposed* Critical Habitat is required to "confer" with the appropriate Service. The results of such conferences are non-binding.

The 1982 Amendments also made four major changes in the consultation process. Early consultation was the first addition. If a project requires a Federal permit or license and the applicant has reason to believe the action may affect

listed species or Critical Habitat, it may request the authorizing Federal agency to initiate early consultation with the Service involved on its behalf. This consultation takes place prior to the submission of the application for the Federal permit or license. The second change under the 1982 Amendments is the involvement of the permit or license applicant in granting time extensions for the completion of biological assessments and biological opinions. The third provision allows for the issuance of an "incidental take" statement along with the biological opinion. Such a statement exempts the Federal agency and any permit or license applicant involved from Section 9 "taking" prohibitions under the Act, if the action is implemented consistent with the terms and conditions included in the incidental take statement. The last change of the 1982 Amendments was the streamlining of the exemption process. The exemption Review Board was replaced by the Secretary of the Interior and the overall timeframe for completion of the process was shortened from 360 to 190 days.

The above changes were mandated by amendments to the Act. However, other changes are included in the final regulations in response to the comments received over the course of time and actually working with the consultation process. For more information, refer to the regulations as published in the June 3, 1986, *Federal Register*, Part II.

Three Animals

(continued from page 1)

one side by a wooded swamp. The turtle's survival is threatened at this location by a high incidence of egg predation and human disturbance.

Heavy recreational use of the turtle's nesting habitat (a beach) by campers during times when turtles are nesting apparently reduces their reproductive success. Three-wheeled vehicles have been observed uncovering nests, resulting in dehydration and breakage of the eggs. These consistent disturbances to the turtle's nesting habitat seem to have affected its overall population, although the total current population size is not known. The remainder of the Alabama red-bellied turtle's habitat, the marshes and bays of the lower part of the Mobile River system, are not as disturbed as the nesting island; however, natural phenomena, such as movement of saltwater wedges up into bays of the lower Mobile Bay area during hurricanes, have probably caused the reductions in aquatic vegeta-

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photo by Robert H. Mount

The Alabama red-bellied turtle's survival is threatened at its one known nesting location by a high incidence of egg predation and human disturbance.

Three Animals

(continued from page 3)

tion, which is necessary during part of the turtle's life-cycle.

The alligator is probably a frequent predator of hatchling and juvenile red-bellied turtles as evidenced by the high incidence of tooth scars found on the shells. Domestic pigs, released onto the nesting island during the late 1960's, have been known to follow the turtles from the water to their nest sites, where the pigs have eaten turtle eggs during and subsequent to laying. Fish crow (*Corvus ossifragus*) predation on turtle eggs also is threatening nesting success.

In addition to the predation problems and the physical disturbance to the nesting area, Alabama red-bellied turtles are incidentally harvested by commercial fishermen and shrimpers in gill, hoop, and trammel nets, and crab traps. Some of the turtles have also been trapped and then sold as pets or food. Such taking of

the species greatly increases its already precarious status.

Because of the Alabama red-bellied turtle's restricted range, apparent scarcity, low population recruitment, and the other factors threatening its survival, the FWS proposed on July 8, 1986, to list this species as Threatened. The proposal does not include a Critical Habitat designation for the species, mostly because the required publication of maps and other publicity accompanying such a designation could greatly increase the collecting pressure already threatening the turtle. Identifying the sole known nesting area, which is on private property, could be detrimental to the species' survival. Nevertheless, even without a formal designation of Critical Habitat, Section 7 of the Endangered Species Act will still provide protection against destruction of the Alabama red-bellied turtle's habitat by Federal activities if the listing proposal is made final. Federal involvement may include U.S. Army Corps of Engineers' per-

mit activities; however, no major conflicts are foreseen at this time.

Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise is a large, dark-brown to grayish-black terrestrial turtle with elephantine hindfeet and shovel-like forefeet. It lives most often on well-drained, sandy soils in forest and grassy areas, ranging along the coastal plain from South Carolina through Florida to southeastern Louisiana. The western population of the gopher tortoise occurs from the Tombigbee and Mobile Rivers in Alabama to southeastern Louisiana, but its distribution within this region is now fragmented and spotty. Conversion of the gopher tortoise's habitat to urban areas, croplands, and pasturelands, along with the effects of certain forest management practices, has reduced habitat in the western portion of the species' historical

(continued on next page)



The gopher tortoise is a dark brown to grayish-black terrestrial turtle, with a shell that can be as large as 14.5 inches (37 cm) long and shovel-like forefeet that make it a proficient burrower.

photo by Ed Wester

Three Animals

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range by more than 80 percent. The status of the eastern population of the species is still under review.

Gopher tortoises are so named because they are proficient burrowers, digging tunnels that can reach up to 35 feet (10 meters) in length for cover and refuge from hot, dry weather. The tunnels are ecologically important not only to tortoises, but to the variety of other animals that seek temporary shelter or that live in them permanently. These species range from insects to burrowing owls, raccoons, possums, frogs, and snakes, including the Threatened eastern indigo snake (*Drymarchon corais couperi*). The burrows provide environmental conditions upon which these other organisms depend that may not otherwise be available within the region.

Only 364,000 acres (147,313 hectares) of suitable habitat remain for the gopher tortoise within its western range, and they are comprised of both public and private lands. The kind of land use changes responsible for most of the past habitat loss are expected to continue, and human population levels within the area are expected to rise. In addition to this habitat loss, modification of habitat associated with certain forest management practices also has contributed to the gopher tortoise's decline. The tortoise requires an open forest floor with grasses and forbs for food and sunny areas for nesting. Regular burning or thinning of trees is required to maintain the habitat in suitable condition, but private landowners may not always manage their lands in ways that benefit the species. Development of thick underbrush, closing of forest canopies, and clearcutting destroys food plants, inhibits nesting, and causes the tortoises to relocate to the edge of roadsides and ditch banks, increasing their susceptibility to human predation and vehicle mortality. Management of the DeSoto National Forest in southeastern Mississippi, which contains gopher tortoise habitat, is probably more compatible with the species' needs, but this national forest comprises only 22 percent of the total remaining western range.

The effects of habitat loss and modification on the gopher tortoise are compounded by the collection of these animals for use and/or sale as food or pets. Almost 97 percent of the young are taken by predators before the end of their second year; although the tortoise historically may have been able to withstand such losses, the added impact of taking by humans is likely leading to an overall decline. Research has shown that up to 20 percent of a colony has been taken at one time for human uses. The impact of taking is intensified by the fact that this activity is directed solely toward the



photo by Dick Biggins

The Cape Fear shiner inhabits streams with pools, riffles, and slow runs over a substrate of gravel, cobble, and boulders.

adult, or reproducing, segment of the population. This threat is further accentuated by the species' low reproductive rate. Females take 13 to 21 years to reach sexual maturity.

Because of the continuing threats to the species' survival in the western portion of its range, the FWS proposed to list the western population as Threatened on July 8, 1986. Although the gopher tortoise is protected against taking in the States of Alabama and Mississippi, and in the DeSoto National Forest, Federal listing under the Endangered Species Act could enhance these protection efforts and provide protection against taking for the species in Louisiana. Federal listing could also promote better management practices for gopher tortoise habitat on Federal lands.

A formal designation of Critical Habitat was not part of this proposed listing. Like the Alabama red-bellied turtle, the gopher tortoise's vulnerability to taking would also increase with the publication of the required Critical Habitat descriptions. Nevertheless, if this proposal is made final, Section 7 provisions will still provide protection for the tortoise against any Federal activities that may modify its habitat. Such activities known at this time include certain U.S. Department of Agriculture timber management practices and military training activities within the DeSoto National Forest.

Cape Fear Shiner (*Notropis mekistocholas*)

The Cape Fear shiner, the only fish known to be endemic to North Carolina's Cape Fear drainage, was proposed by the FWS on July 11, 1986, for listing as

an Endangered species. Although it is known to have occurred historically in nine stream reaches, the Cape Fear shiner apparently now survives in only three small populations. Of these, only the population at the junction of the Deep and Rocky Rivers in Chatham and Lee Counties appears strong. A 1985 survey of the second population in the Rocky River, upstream from the backwaters of the Rocky River hydroelectric facility, located only one specimen. The third population, located in the Deep River system in Moore and Randolph Counties, is represented by the collection of only six individuals above and below the High-falls Hydroelectric Reservoir.

Dam construction in the Cape Fear drainage probably has had the most serious impact on the species by inundating the rocky, free-flowing riverine habitat upon which it depends. Two U.S. Army Corps of Engineers (COE) reservoir projects currently being considered for the Deep River could further threaten the shiner. Deteriorating water quality, mainly the result of siltation, has been another major factor in the species' decline. Other activities that could further modify the aquatic habitat, if the proper safeguards are not in place, include wastewater discharge, stream channelization, road and bridge construction, and changes in downstream flows released from existing hydroelectric facilities.

Included in the proposal to list the Cape Fear shiner as Endangered was a provision for designating Critical Habitat along approximately 5 miles (8 kilometers) of the Rocky River in Chatham County; 8 miles (12.8 km) of Bear Creek, Rocky River, and Deep

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Three Animals

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River in Chatham and Lee Counties; and 6 miles (9.6 km) of Fork Creek and Deep River in Randolph and Moore Counties. (Maps are available in the July 11, 1986, *Federal Register*.) If the listing and Critical Habitat proposals are made final, Federal agencies will be required to avoid any activity that is likely to jeopardize the species or adversely modify its Critical Habitat.

* * *

Available Conservation Measures

Among the conservation benefits provided by a listing under the Endangered Species Act as Threatened or Endan-

gered are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the FWS to develop and implement recovery plans; the possibility of Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they

authorize, fund, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its Critical Habitat. If an agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy or adverse modification. For species that are *proposed* for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding. Potential conflicts almost always are avoided by planning early and using the Section 7 process.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or traffic in listed animals, except by permit for certain conservation purposes.

Listings Become Final for Two Animals and Four Plants

During July 1986, the following taxa were added to the Federal List of Endangered and Threatened Wildlife and Plants:

Spikedace (*Meda fulgida*)

This small fish, the only species in its genus, once inhabited various streams within the Gila River drainage upstream of Phoenix in Arizona, New Mexico, and northern Mexico (Sonora). Because of widespread habitat modification, primarily the result of stream diversion structures and water quality degradation, the spikedace has disappeared from approximately 94 percent of its historical range. Several dams under consideration for construction could further threaten the species. For this reason, the FWS proposed on June 18, 1985, to list the spikedace as Threatened and to designate its Critical Habitat (story in BULLETIN Vol. X No. 7). The final listing rule was published in the July 1, 1986, *Federal Register*, but a decision on Critical Habitat was postponed (until no later than June 18, 1987) for further review of the economic data required for such a designation.

Florida Grasshopper Sparrow (*Ammodramus* *savannarum floridanus*)

An isolated subspecies of a more widely distributed bird, *A. s. floridanus* is endemic to the prairie region of south-central Florida. In the early 1900's, populations of this subspecies were reportedly large and widespread, but 1980-1984 surveys indicate that only about 250 adults remain. The main reason for this

decline was the loss of nesting and foraging habitat by the conversion of native vegetation to improved pasture. Because further habitat modification could lead to the bird's extinction, the FWS proposed it on December 15, 1985, for listing as Endangered (summary in BULLETIN Vol. XI No. 1). The final listing action was published July 31, 1986.

Uhiuhi (*Mezoneuron* *kavaïense*)

A member of the pea family (Fabaceae), this tree grows up to 34 feet (10 meters) in height and is endemic to the Hawaiian Islands. Although it once was fairly common on the islands of Hawai'i, Maui, O'ahu, and Kaua'i, only three small populations, totalling fewer than 50 individuals, remain. They are located on State and private lands in North Kona, island of Hawai'i; western Kaua'i; and the Wai'anae Mountains, island of O'ahu. Only the O'ahu trees show signs of successful reproduction. The factors responsible for the uhiuhi's decline—grazing by domestic and feral livestock; competition from exotic plants; damage by non-native rodents and insects; and wildfires—threaten the species with extinction. It was proposed for listing as Endangered on August 5, 1985 (summary in BULLETIN Vol. X No. 9), and the final rule was published July 8, 1986.

Palmate-bracted Bird's-beak (*Cordylanthus palmatus*)

An annual herb in the snapdragon family (Scrophulariaceae), this California plant is known to occur only on a rare

saline-alkali soil type found in central California's lowland flats and plains. It has been collected historically from eight scattered locations in Fresno, San Joaquin, Yolo, Colusa, and Madera Counties. Currently, however, only three populations are known: two natural populations in Alameda and Yolo Counties, and a transplanted colony at Mendota State Wildlife Management Area in Fresno County. The others were lost when urbanization, agricultural operations, intensive livestock grazing, and other land uses altered the native plant communities that supported the species.

C. palmatus habitat continues to face threats from urban and agricultural development, and from off-road vehicle (ORV) use. In an effort to prevent the plant's extinction, the FWS proposed on July 15, 1985, to list it as Endangered (summary in BULLETIN Vol. X No. 8). The final listing was published July 1, 1986.

Steamboat Buckwheat (*Eriogonum ovalifolium* var. *williamsae*)

This member of the buckwheat family (Polygonaceae) is known from a 100-acre (40-hectare) site at Steamboat Hot Springs in Washoe County, Nevada. Seven colonies are scattered throughout the area on privately-owned land and property administered by the Bureau of Land Management (BLM). The plant is a low-growing perennial with small, greenish-white leaves arranged in tight rosettes, and it frequently forms large mats. Its habitat has been damaged by ORV use, dumping of refuse, and activities that result in changes in moisture patterns (to which this species is sensi-

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Final Listings

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tive). Other potential threats include the drilling of geothermal test wells, development of a recreational park, and mining on private lands. The subspecies was proposed September 12, 1985, for listing as Endangered (summary in BULLETIN Vol. X No. 10), and the final rule was published July 8, 1986. The BLM has expressed interest in working with the public and the private landowners to develop conservation programs for the species.

Pondberry (*Lindera melissifolia*)

L. melissifolia, a small deciduous shrub, can be distinguished from the other two North American members of its genus by its drooping, membranaceous leaves that give off a strong, sassafras-like odor when crushed. It is known historically from nine southeastern

States, but it apparently has been extirpated from Florida, Alabama, and Louisiana. Only 19 populations are known to survive in North Carolina, South Carolina, Georgia, Mississippi, Arkansas, and Missouri. The bottomland hardwood stands, poorly drained depressions, and margins of limestone sinks in which this moisture-dependent shrub grows have been tremendously reduced in number by land clearing and drainage activities. Because most of the remaining sites faced similar threats, the FWS proposed *L. melissifolia* on August 14, 1985, for listing as an Endangered species (summary in BULLETIN Vol. X No. 9). The listing became final July 31, 1986.

* * *

Available Conservation Measures

Now that they are listed, these taxa receive the full protection available under

the Endangered Species Act. Section 7 of the Endangered Species Act requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. If an agency determines that one of its activities may affect a listed species, it must consult with the FWS to find a way to avoid jeopardy.

The rules under the Act with regard to the take of listed species vary. It is illegal to take, possess, transport, or traffic in listed animals; for plants, however, the prohibition is limited to the removal of listed taxa from lands under Federal jurisdiction. Other provisions of the Act that apply to both animals and plants include the requirement for the FWS to develop and implement a recovery plan; the potential for Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the possibility of land acquisition or exchanges to conserve essential habitat.

Red Wolf

(continued from page 1)

in conjunction with the nonessential experimental population proposal. Potential management actions that would involve take include the recapture of wolves to replace transmitters or capture collars, the provision of routine veterinary care, the return of animals to the refuge if they stray outside its boundaries, or the return to captivity of animals judged to be unhealthy or a threat to human safety or property.

For years, a great deal of investigative effort by the FWS has been directed at locating suitable release sites throughout the historical range of the red wolf. Apparently ideal habitat for this species has been located at Alligator River National Wildlife Refuge, which comprises nearly 120,000 acres (48,564 hectares) of the finest wetland ecosystems found in the Mid-Atlantic region. Principal natural communities in the refuge include broad expanses of palustrine (non-riverine) swamp forests, pocosins, and freshwater and salt marshes. Adjacent to the refuge is a 47,000-acre (19,020-ha) U.S. Air Force bombing range with similar habitat. The very limited live ordnance expended by the Air Force and Navy on this range is restricted to two extremely small target areas.

Establishing an experimental population of red wolves on the refuge would greatly enhance the species' recovery potential by demonstrating the feasibility of a large predator reintroduction. The approved Red Wolf Recovery Plan calls

for the establishment of three self-sustaining populations at different locations throughout the species' historical range before it can be considered for possible reclassification from its Endangered status. By demonstrating that reintroduction of red wolves into suitable habitat is feasible, the FWS hopes that other Federal land management agencies in the Southeast will become interested in further reintroduction efforts.

If the experimental population proposal is approved, plans call for the acclimation of wolves for 6 months in captive pens on the refuge, followed by a release of three pairs in the spring of 1987. If that initial release is successful, two or three additional pairs would be reintroduced the next spring. The animals would be closely monitored via radio telemetry during the first 3 to 5 months following their release. After this initial monitoring phase, periodic checks would be made to determine if established home ranges are being maintained. It is anticipated that, because of the size and habitat characteristics of the reintroduction area, animals will remain within the boundaries of the refuge and adjacent military lands. If a wolf were to stray off the refuge, the FWS would recapture the animal.

Red wolves are shy animals, and most visitors to the refuge would not notice their presence. As a precaution, however, the proposed special regulations state that there would be no penalty for incidental take of wolves in the course of otherwise lawful hunting, trapping, or other recreational activities, or in defense of human life, provided that the taking is immediately reported to the FWS.

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bat population to recover to the extent that harvesting on a limited scale for domestic use could be sustained. The FWS recommended that (1) this taking be limited to subsistence harvest of not more than 20 percent of the fruit bat populations and (2) only traditional methods (nets) or air guns be used.

FWS observations of domestic use of fruit bats on Yap suggests that less than 20 percent would be taken annually for subsistence purposes. Illegal shipments of fruit bats from Yap, if any, will be monitored in cooperation with the Guam Division of Aquatic and Wildlife Resources and the Commonwealth of the Mariana Islands' Division of Fish and Wildlife through landing permits.

* * *

The Olympia, Washington, Field Office assisted Washington Department of Game personnel in recovering a whole peregrine falcon (*Falco peregrinus*) egg from an eyrie that had been abandoned in early June. The egg was sent to the Patuxent Wildlife Research Center in Laurel, Maryland, for pesticide and heavy metals analyses. This is the first whole peregrine egg to be recovered for analysis in Washington State.

A peregrine eyrie also was discovered in the Columbia Gorge by Washington Department of Game personnel. The site is located near The Dalles in an area where cross-fostering of peregrine chicks with adult prairie falcons had occurred a few years ago. One of the adults had a

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band, but the number could not be read. The pair fledged three young.

The wolf ecology volunteer at the Boise, Idaho, Field Office recently presented wolf recovery information and materials to 70 youths, and has also formed the Idaho Wolf Recovery Foundation to raise funds to aid in wolf recovery information distribution and education. Additionally, a wolf was seen in the Bear Valley area of central Idaho, an area where wolves have been reported previously.

As a result of the Gearhart Ranch Development in Oregon's Clatsop County, the Portland Regional Office has received several inquiries from potential developers and landowners indicating substantial interest in developing a Habitat Conservation Plan for the Clatsop Plain population of the Threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*).

The SESO recently assisted The Nature Conservancy in completing the first population estimate of the Endangered Borax Lake chub (*Gila boraxobius*) of southeastern Oregon. This dwarf chub species is endemic to Borax Lake, Lower Borax Lake, and adjacent ponds and marshes. The vast majority of the species' habitat is found in the 10-acre Borax Lake, where the population was estimated at slightly over 11,000.

Over 30 volunteers from Trout Unlimited assisted in a cooperative State and Federal effort to implement some of this year's recovery actions for the Threatened Paiute cutthroat trout (*Salmo clarki seleniris*). During the Fourth of July weekend, the Trout Unlimited volunteers helped to install fences to improve habitat conditions in the Silver King Creek drainage, located in California's Alpine County. During the Labor Day weekend, the volunteers returned to install instream structures. Because this habitat lies within a newly established wilderness area, these recovery actions were done without the use of mechanized equipment.

Nine bald eagle (*Haliaeetus leucocephalus*) nestlings were removed from nests in British Columbia and released on Santa Catalina Island, California, by the Wildlife Studies Institute. Eight successfully fledged, but one was retained in captivity because it was injured from a fall during its collection. The eight immature eagles will supplement the island's current population of at least nine eagles, which were released in previous years.

A single immature bald eagle was released on the central coast of California by the Ventura Wilderness Sanctuary. This eagle, which was taken from a wild nest in northern California as an egg, was hatched by the Santa Cruz Predatory Bird Research Group and then raised by the San Francisco Zoo. A second release was scheduled, but the nestling died from unknown causes.

The SESO met with representatives of the Bureau of Land Management (BLM); Lake County, Oregon; Federal Highways Administration (FHWA); and Oregon Department of Transportation to discuss impacts of highway construction on habitat of the Threatened Warner sucker (*Catostomus warnerensis*) in Oregon. Because expansion of the roadway may affect Twentymile Creek, which is designated as Critical Habitat for the species in south-central Oregon, it was agreed that a bridge crossing will be modified to protect sensitive habitats. The BLM and FHWA will enter into a joint formal consultation (under Section 7 of the Endangered Species Act) with the FWS on the project.

FWS Great Basin Complex personnel at Reno, Nevada, located a population of the Dixie Valley tui chub (*Gila bicolor* sp.), a Category-2 listing candidate, in a small impoundment supplied from an artesian well. Both juveniles and adults were present, but no estimate of the total population was made. There was no sign of the fish in other spring outflows and seeps in the area. This population of tui chub is one of only two known to exist in Dixie Valley.

The Peregrine Fund at Boise, Idaho, reported that 81 peregrine falcons were released in the States of Oregon, Washington, Idaho, Colorado, Utah, Wyoming, and Montana through July 1986. Another 78 peregrines were shipped to the eastern facility at Cornell University for later release.

Region 2—Of the 26 viable whooping crane (*Grus americana*) eggs left in nests at Canada's Wood Buffalo National Park this season, at least 22 hatched. The previous record number of eggs known to hatch in a year was 21 in 1984. Water conditions are good in Canada and biologists are hoping for another record year for chick survival. Of the 25 eggs taken by biologists for the Rocky Mountain or Patuxent Wildlife Research Center flocks, 12 hatched.

Dr. James Lewis, FWS Whooping Crane Coordinator, assisted National Wildlife Health Laboratory personnel in developing a proposal to research avian tuberculosis. This research is designed to identify prevalence of the disease in birds

that whooping cranes associate with and in habitats the cranes use. Three whooping cranes of the Rocky Mountain population were found infected with tuberculosis this spring. The goal of the research is to reduce prevalence of the disease in whoopers and waterfowl.

The Arizona Game and Fish Department (AGFD) has approached the FWS with an interesting and innovative proposal—establishing a trophy sport fishery for the Endangered Colorado squawfish (*Ptychocheilus lucius*) in the lower Colorado River, where self-sustaining populations no longer occur. It proposes that the FWS provide AGFD with fry-size squawfish from Dexter National Fish Hatchery. AGFD will then enact special fishing regulations governing take of the fish and will grow the fry to a larger size before stocking them in the river. It also proposes that the FWS provide an "experimental nonessential" designation for such reintroduced fish populations. AGFD personnel will monitor the program.

The Colorado squawfish has many qualities that might make it an ideal sport fish. It readily takes artificial lures, grows to a large size, and is good eating. Early settlers in the southwest called it the "white salmon of the Colorado."

The rapid spread of the sheephead minnow (*Cyprinodon variegatus*) in the Pecos River drainage of Texas has caused concern among southwestern fish experts. Through hybridization, the sheephead minnow is rapidly eliminating the native Pecos pupfish (*Cyprinodon pecosensis*), a Category-2 listing candidate, from the drainage. Most of the Pecos pupfish range in Texas has already been lost, and only a low dam has prevented the spread of the exotic sheephead minnow into New Mexico. To better understand the dimensions of the problem, the FWS has contracted a study through the Oklahoma Cooperative Fish and Wildlife Research Unit. Dr. Anthony Echelle will conduct the study to determine the extent of hybridization and try to find a method to prevent contamination of the remaining Pecos River in New Mexico.

Peregrine falcon reproduction in Big Bend National Park of western Texas has been barely sufficient to maintain current population levels, with 1.25 young produced per territorial adult pair. The monitoring effort was funded by the National Park Service and FWS. One new site was located. Results of recent analyses of peregrine prey in Big Bend indicate minimal levels of DDE residues in white-winged and mourning doves, but levels found (1-7 parts per million) in black phoebes and rough-winged and

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cliff swallows are sufficient to cause significant eggshell thinning and reproduction problems in the local peregrine population.

On February 25, 1986, the northern aplomado falcon (*Falco femoralis septentrionalis*) was listed as Endangered throughout its historic range in Mexico and Guatemala, and in the States of Texas, New Mexico, and Arizona. (See story in BULLETIN Vol. XI No. 3.) The last documented nesting record in the U.S. was in New Mexico in 1952. The Peregrine Fund currently has a small captive population of 12 aplomado falcons, and has begun an experimental release of captive-reared birds in south Texas. In 1985, four birds were released near Sarita, Texas, on the King Ranch.

Predation by great horned owls and harassment of the fledglings by scissor-tailed flycatchers proved to be difficult problems. In preparation for a second release effort in 1986, three criteria were used to select a release site: (1) amount of suitable habitat; (2) proximity to additional suitable habitat; and (3) potential problems with great horned owls. After examination of several potential sites, Laguna Atascosa NWR (on the south Texas coast) was selected.

On July 2, two male and two female fledgling aplomado falcons were released by Peregrine Fund personnel. A few days after the release, the oldest male disappeared. As of August, the three remaining fledglings were quickly approaching independence after 4 weeks of liberty. They have been observed by the hack site attendants pursuing and capturing both invertebrate and vertebrate prey, including dragonflies, fiddler crabs, and a bronzed cowbird. The Peregrine Fund hopes to continue releases at Laguna Atascosa and throughout the Texas prairie coastal region.

The presence of a jaguarundi (*Felis yagouaroundi cacomitli*) in southern Texas has been confirmed in the wild through the collection of a road-killed specimen in Cameron County. Although sightings of the species are frequently reported, the animal's presence has not been confirmed with a specimen or photograph since 1952 when a specimen was also obtained from Cameron County.

The road-killed animal was found several miles from an area where there have been several unconfirmed sightings in the past few years. Researchers from the Caesar Kleberg Wildlife Research Institute will actively monitor the area with cameras in an attempt to further document the presence of the species and determine its status.

State of New Mexico, White Sands Missile Range, and FWS personnel relocated the type locality of Todsens pen-

nyroyal (*Hedeoma todsenii*) at the White Sands Missile Range in early August. They also surveyed for another population of the plant with no success. The small population (less than 500 individuals) at the missile range occurs in a very steep-sided, north-facing, gypseous limestone canyon. The potential habitat was mapped and an intensive survey of these areas will be organized for the 1987 field season.

The Bureau of Reclamation (BR) recently awarded a 4-year research contract at BioSystems Analysis Inc., of Santa Cruz, California, for studies on the breeding bald eagle population in central Arizona. The project will investigate the eagle's foraging ecology and movements, and will include telemetry of both adults and juveniles.

As of the end of August, 650 masked bobwhites (*Colinus virginianus ridgwayi*) were released on the Buenos Aires NWR in Arizona. An additional 1,400 are scheduled for release this year, accompanied by their south Texas quail foster fathers. Radio telemetry studies of these birds are being initiated by the Arizona Cooperative Wildlife Research Unit at the University of Arizona to determine the bobwhite's movements and habitat use patterns.

A 10,000-acre fire occurred on the refuge this spring, but the burn area has "greened-up" because of favorable summer rainfall. Thus far, few adult masked bobwhite have been found from last year's releases.

Four pairs of least terns (*Sterna antiillarum*) fledged two young this summer on and near Bitter Lake NWR in southeastern New Mexico, which is the westernmost site for this population. Tern sur-

veys funded by the BR were conducted in mid-June along the Cimarron and Canadian Rivers in western Oklahoma. A total population of 200 adult terns was estimated for that area.

Region 3—The presence of a wild-hatched peregrine falcon chick, the first produced in the wild in the Midwest since the late 1950's, was confirmed near Weaver Dunes (MN) in June. However, shortly after, the chick disappeared. It is presumed that the chick was taken by a great-horned owl.

The Minnesota Department of Natural Resources reported that a population of the western prairie fringed orchid (*Platanthera praeclara*), a Category-2 candidate species located near Crookston, Minnesota, was destroyed by something that ate the plants off at ground level.

One of three prairie bush-clover (*Lespedeza leptostachya*) populations in Wisconsin was inspected on August 5. Approximately 160 plants were found, making this population, which is located near River Falls, the largest in the State. Currently, the plants seem to be holding their own, but they are located in an area that has potential for housing development.

A total of 51 peregrine falcons were released within Region 3 this year at 6 sites in 4 States. A report was also received of a peregrine taking up residency in downtown Indianapolis.

Region 3 staff members, along with a University of Wisconsin researcher, visited a number of northern wild monkshood (*Aconitum noveboracense*) sites in Iowa and Wisconsin during August. The trip's purpose was to gain familiarity with more of the sites included in the "Driftless Area" acquisition proposal and also to assist with the species' recovery plan revision. Various threats to the plants were witnessed firsthand, including grazing, road construction, and consumption by snails and lepidoptera larvae.

Region 4—The Pepsi Cola Company in Tampa, Florida, donated \$500,000 to the Lowry Park Zoo in Tampa for the construction of manatee rehabilitation, research, and public education facilities. The zoo is currently undergoing a multi-million dollar reconstruction and expansion program. At present, there are no holding facilities in Florida that have been specifically designed for holding, research, and display of manatees.

Biologists with Puerto Rico's Department of Natural Resources (DNR) are



Male jaguarundi

photo by Gary Halvorson

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experimenting with a new nest box design for Endangered yellow-shouldered blackbirds (*Agelaius xanthomus*) in protected mangrove areas of southwestern Puerto Rico. In the past, DNR and FWS biologists placed traditional wooden nest boxes in three areas within the Pitahaya mangrove system. These boxes have several drawbacks: they are heavily used by Caribbean martins (which outcompete blackbirds for these sites), they require frequent maintenance, and they are infrequently used by blackbirds (2 out of 30 nests in 1986).

Biologists have observed that blackbirds prefer stump-top depressions to actual cavities for nesting. DNR's new artificial nest design capitalizes on this preference. It consists of a 4-inch diameter, 12-inch long section of brown PVC pipe with criss-crossing wires forming a base for nest construction either 4 or 10 inches down inside the pipe. The pipes are placed on posts, and rat guards are used to reduce predation. Thus far, 25 percent of the traditional nest boxes have been replaced with the new design. The new nesting structures are proving to attract more blackbirds.

The Caribbean Islands NWR has contracted with Louisiana State University's Cooperative Research Unit to study the population ecology of the St. Croix ground lizard (*Ameiva polops*) on Green Cay. The species was listed as Endangered with Critical Habitat in 1977. Once found throughout St. Croix, the U.S. Virgin Islands, and outlying cays, this lizard is now restricted to Green and Protestant Cays, off the north shore of St. Croix. The Protestant Cay population is relatively unprotected, with a large commercial resort occupying most of the cay; Green Cay, however, is part of the refuge.

An estimate of population numbers, time/activity budget, habitat preferences, and spacing patterns will be included in the study. Also included will be breeding chronology, mortality factors, and observations of feeding behavior. The data obtained from the study will be used to assess the current status of the species and to establish criteria for selection of suitable release sites for future re-introduction.

Harper's beauty (*Harperocalis flava*), an Endangered plant endemic to Apalachicola National Forest in the Florida panhandle, is essentially restricted to the shoulders of a single highway, where its numbers appear to be increasing. In an effort to see if new populations of this vulnerable species can be established in unoccupied savanna habitat, U.S. Forest

Service (USFS) personnel transplanted plugs of sod containing the plant into several sites last fall. An inspection of the area in late May showed that most of the transplanted plants were alive, and that many were flowering despite a severe drought. These encouraging first-year results indicate that transplantation may be a useful method for determining the habitat requirements and studying the population of this plant, and possibly for other plants of similar savanna and coastal plain bog habitats.

Staff from the Jacksonville, Florida, Endangered Species Field Office conducted a field survey of Alabama and Perdido Key beach mouse (*Peromyscus polionotus ammobates* and *P. p. trissyllepsis*) habitat. Despite the rapid growth of recreational and beach development along the Florida and Alabama Gulf coast, biologists found relatively little loss or deterioration of known beach mouse habitat since the last survey, conducted over a year ago.

Members of the Jackson, Mississippi, and Jacksonville Endangered Species Field Offices met at Fort Pickens, Florida, on July 1 with representatives of the National Park Service, the Florida Game and Fresh Water Fish Commission, and the Alabama Cooperative Wildlife Research Unit to discuss the recently prepared technical draft recovery plan for the Alabama, Choctawhatchee (*P. p. alophrys*), and Perdido Key beach mice. Jointly prepared by the Jackson and Jacksonville staffs, the draft was well received by these reviewing agencies. Comments and revisions will be incorporated into an agency draft of the recovery plan, which is due for completion by December 1, 1986.

An unusual nest was discovered during this year's annual brown pelican (*Pelecanus occidentalis*) nesting survey at Gaillard Island in Mobile Bay, Alabama. Amid a laughing gull (*Larus atricilla*) nesting area, a single herring gull (*L. argentatus*) nest containing two eggs was noted. In recent years, ornithologists have noted that herring gull nesting has been spreading to the south; however, the most southerly nesting record for this species had been from North Carolina. Other species nesting on this man-made island, created by the Corps of Engineers to contain dredged material, are least terns (*Sterna albifrons*) and Caspian terns (*S. caspia*). Over 200 brown pelican nests were documented during the survey. The population continues to increase since the colony's inception 4 years ago.

Dr. Mike Howell of Samford University, acting under contract with the Jackson Endangered Species Field Office, has

completed the second of five annual population surveys of the Endangered water-cress darter (*Etheostoma nuchale*). This darter is restricted to three localities in Jefferson County, Alabama. The 1986 surveys indicate that the darter is now flourishing in two of the three known spring pond habitats. However, the population at the third site continues to decline. The FWS intends to initiate an effort to establish additional populations within the species' former range.

In a recent survey conducted for The Nature Conservancy, researchers discovered that one of two known populations of the Threatened Stock Island tree snail (*Orthalicus reses reses*) has been extirpated and the remaining population reduced to fewer than 100. The two populations were confined to a patch of natural hammock approximately 4.8 acres in size on a municipal golf course. The area is immediately adjacent to private property on Stock Island in Monroe County, Florida. The only remaining trees that provide habitat for the snails occur in an otherwise paved municipal county parking lot adjacent to the golf course.

Stock Island tree snails inhabit a wide variety of hammock trees. They feed on lichens, fungi, and algae growing on the limbs and leaves. Tree snails lay their eggs in soft leaf litter at the base of trees and remain buried in the litter from 72 to 96 hours during nesting. Most of the remaining trees on the county parking lot have white gravel or cement poured at their base, eliminating the leaf litter and rendering them useless for egg-laying. Researchers estimate that if action is not taken immediately, this snail could become extinct within the next 5 years.

The Jacksonville, Florida, District of the Army Corps of Engineers will prepare an Environmental assessment concerning the potential impacts of residential development around the West Palm Beach Water Catchment Area (CA). The CA was purchased by the city to safeguard an important wetland that supplies drinking water. In 1985, the CA was discovered to be critical drought-related habitat for the Endangered Florida snail kite (*Rostrhamus sociabilis plumbeus*). Almost the entire known population, 372 kites, roosted adjacent to the CA on June 12. At least one nesting occurred.

The CA is surrounded by private lands for which a variety of dredge-and-fill permits are being sought. The Corps of Engineers, which has jurisdiction over many of the wetlands in the area, will address the potential cumulative effects of development around the CA on endangered species and the general environment.

The Endangered Species Field Office in Jackson, Mississippi, has received a

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status survey report on the bog spice bush (*Lindera subcoriacea*), a Category-2 listing candidate. The report was prepared by the Mississippi Natural Heritage Program (MNHP) of the Mississippi Museum of Natural Science, under contract with the FWS. The bog spice bush is a deciduous shrub that occurs in wet, peaty, shrub bogs and along peaty drainages at scattered sites in Louisiana, Mississippi, Georgia, South Carolina, and North Carolina. Many of the populations have low numbers of plants and are threatened with habitat destruction. The MNHP conducted field surveys only in Mississippi and Louisiana. Additional information from the other States will be obtained, and all data will be analyzed to determine if this species warrants a proposed listing.

* * *

Region 5—The annual Virginia big-eared bat (*Plecotus townsendii virginianus*) maternity colony census was conducted during June in West Virginia. Seven of the nine known maternity colonies had increased in size from 1985, while two had decreased. Overall, the population of known reproductive females has increased by more than 14 percent from last year and nearly 24 percent from 1983, the first year the counts were made. This increase is likely due in part to protective measures (i.e., gates and fences) taken by the FWS and the USFS, and to the cooperation of cavers in abiding by entry restrictions when the bats are present.

* * *

The National Wildlife Federation's Raptor Information Center reports that bald eagle reproduction around the Chesapeake Bay is still on the increase. In Maryland, Delaware, and Virginia, there were a total of 136 occupied nests this year, 100 of which were successful, producing 190 eaglets. This is the highest number of young produced since the Chesapeake Bay Bald Eagle Banding Project began 10 years ago.

Elsewhere in the Chesapeake Bay region, success was mixed. West Virginia's one known nesting pair of eagles fledged triplets; in Pennsylvania, however, there was no known nesting success this year.

During July 6-11, eight young bald eagles were collected from the Winnipegosis area of Manitoba, Canada. These eaglets were later flown by chartered aircraft to the Delaware Bay hack sight in southern New Jersey. The following week, 2 additional eagles that fell from their nests also were sent to New Jersey, bringing the total to 10 eaglets to be released.

Peregrine falcons nested successfully at 8 sites in New York, New Hampshire, and Vermont, fledging 16 young. In Maryland, 4 nesting pairs fledged 11 young, and in Virginia, 3 successful nests produced a total of 7 fledglings. In all this year, at least 52 peregrines are known to have been produced in the wild in Region 5 States. In addition to these, approximately 100 birds were released as part of the Peregrine Fund's ongoing restoration effort.

* * *

Thirty-two Plymouth red-bellied turtles (*Pseudemys rubriventris bangsi*) were released at the Massasoit NWR in Plymouth County, Massachusetts, in another attempt to revive this highly endangered species found only in a small corner of southeastern Massachusetts. This is the second consecutive year that Massachusetts Division of Fisheries and Wildlife and New England Aquarium personnel have salvaged eggs from the wild and transferred them to a controlled environment at the aquarium in Boston, where they were allowed to grow successfully through the winter and spring months. The fate of the Plymouth red-bellied turtle in recent years has worried conservationists, who estimate that only 300 adults remain, but this "head start" program may help the subspecies win the race of survival.

* * *

Region 6—Summer surveys of black-footed ferret (*Mustela nigripes*) habitat near Meeteetse, Wyoming, revealed two ferret families and three individual animals. Four of these ferrets (three juvenile females, one mature male) have been captured and added to the six ferrets previously held at Wyoming Game and Fish Department's Sybille Wildlife Research Unit located near Wheatland, Wyoming. Several additional animals are known to remain in the wild near Meeteetse.

The Wyoming Game and Fish Department prepared "Recommendations for Capture of Black-footed Ferrets to Enhance the Captive Breeding Program in 1986." This document recommends management actions based on the total number of ferrets found at Meeteetse in 1986. The FWS has reviewed and supports this plan.

Construction of an expanded captive breeding facility in which to house and rear captive ferrets was started at the Sybille Wildlife Research Unit in July 1986. This facility should be completed by the end of November.

* * *

A pair of adult peregrine falcons nested on the roof of the Westin Hotel in downtown Salt Lake City, Utah, this year. Four eggs were laid, but they disappeared. The birds renested, laying three more eggs in a hack box which had been placed on the hotel roof by wildlife offi-

cials. These eggs did successfully hatch.

On August 10, the young birds, suspected to be two males and one female, fledged from the hack box. There was an effort by personnel from the Utah Division of Wildlife Resources and the FWS to protect the fledglings from the hazards of the big city, such as traffic and tall glass buildings, during the bird's first days on the wing. Wildlife officials sporting bright orange safety vests ran out amidst the traffic two or three times to perform rescue missions. Orange signs were posted on the street in front of the hotel that cautions, "Falcon Bird Watch Area—Prepare to STOP." The birds have now taken to the air and are doing well, and the operation has ended.

* * *

Region 7—FWS biologists recently visited Amak Island, a remote volcanic island north of the Alaska Peninsula, where two endemic Category-2 listing candidates are found. Neither the Amak vole (*Microtus oeconomus amakensis*) nor the Amak song sparrow (*Melospiza melodia amaka*) had been observed in several years. Although no voles were seen, numerous song sparrows were encountered. It is unknown, however, whether the sparrows on Amak are *M. m. amaka* or a mainland subspecies pioneering unoccupied habitat.

* * *

Efforts to locate the Aleutian shield fern (*Polystichum aleuticum*), a Category-2 listing candidate, will continue when FWS botanist Steve Talbot attempts to rediscover a small population last observed on Alaska's Adak Island in 1975. Perhaps the rarest fern in North America, this species is Region 7's highest priority for Endangered Species Act listing.

* * *

Surveys for peregrine falcons and nestling banding efforts continue along several major Alaska rivers. Preliminary results indicate that a stable or increasing population trend is continuing for peregrines along most rivers. As in past years, the surveys were a cooperative effort involving volunteers, university students, and biologists from the FWS, the Bureau of Land Management, and the National Park Service. The Alaska Department of Fish and Game, through the Endangered Species Act-Section 6 program, also participated this year by surveying four rivers in northwest Alaska.

* * *

Region 8 (Research)—The last known wild female California condor (*Gymnogyps californianus*), a member of the only known pair breeding in 1986, was caught on June 5 by researchers from the Condor Research Center in Ventura, California. The condor was transported to the San Diego Wild Animal Park, where

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New Hope for the Southern Sea Otter

Editor's note: On August 15, 1986, the FWS proposed to establish an experimental population of the southern sea otter, now listed as Threatened, at San Nicolas Island off southern California. Because of the controversy surrounding the management of this taxon, Wilbur (Skip) Ladd, Project Leader of the FWS Office of Sea Otter Coordination in Sacramento, California, has prepared the following overview:

—Part 1—

Populations of the sea otter (*Enhydra lutris*) once inhabited shallow, nearshore marine waters throughout the northern Pacific Ocean, from Japan (Kurile Islands), Russia (eastern Kamchatka), Alaska, Canada, and the continental United States to central Baja California,

Mexico. They were reduced to near extinction by the late 1800's, however, as a result of commercial fur hunting. Although the exact numbers are not known, estimates are that the overall population once numbered between 150,000 and 300,000; these numbers were reduced to approximately only 2,000-3,000 in several remnant populations by the time commercial exploitation was stopped in the early 1900's. One of the surviving colonies was in central California, along the Big Sur coast, where there were an estimated 100-300 by 1938. (The historical population in California has been estimated at between 16,000 and 20,000.) Given the full protection of the Fur Seal Treaty Act and State law, the California population slowly began to grow and repopulate parts of its historical range until the early to mid-1970's. At that time, the popula-

tion was estimated to contain about 1,800 animals, or about 10 percent of its historical level.

The taxonomic status of sea otter populations has been debated for years by the "splitters and lumpers." The splitters have described three subspecies (*E. l. lutris*, *nereis*, and *gracilis*) and the lumpers one (*E. l. lutris*). This debate rages on, and it may never be resolved to the satisfaction of both groups. During the Endangered Species Act (Act) listing process, the Fish and Wildlife Service (FWS) acknowledged the taxonomic controversy but took the conservative position of using the subspecific name, *E. l. nereis*, in the final listing document. Supplemental information pointed out that the taxonomic status was not a consideration as to whether or not the California sea otter should be listed because the Act al-

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Sea otter (*Enhydra lutris*) in Monterey Bay, California.

lows the listing of distinct populations of vertebrate animals.

Population Status and Trend

Since at least the mid-1970's, California sea otter numbers have not grown and may have experienced a slight decline, although the animals did continue to reoccupy additional historical habitat. Until 1982, the population size was estimated using data from aerial and ground counts, with extrapolations to account for various biases. Beginning in 1982, ground counts, supplemented with aerial counts in inaccessible areas, have been the standard method. The counts since 1982 have ranged from a low of 1,221 in fall 1985 to a high of 1,570 in spring 1986. No discernible trend has been apparent since 1982. The current range lies along a 220-mile stretch of the central California coast between Ano Nuevo Point in Santa Cruz County and the mouth of the Santa Maria River in San Luis Obispo County, with a few individuals sighted occasionally outside that range.

Contemporary Conflicts and Problems

Contemporary conflicts, for the most part, can be summed up in three issues—1) effects of otters on shellfisheries, 2) incidental entanglement and drowning of sea otters in commercial halibut gill and trammel nets, and 3) the effects of outer continental shelf (OCS) oil development, production, and transportation.

During the absence of sea otters following the species' commercial exploitation, shellfish and other macro-invertebrates, the principal prey of otters, flourished throughout much of the California coast. Abalone, crab, Pismo and other clams, and sea urchin populations grew large enough to attract a commercial harvest for foreign and domestic markets. For example, an intensive and lucrative abalone fishery became established by the 1950's and harvest of Pismo clams became a popular recreational activity. By the late 1970's, when the sea otter had reestablished itself along several hundred miles of coast, the red abalone and Pismo clam populations along the central coast had been depleted to the point that no commercial harvest was possible and sport harvest was reduced. Although the reasons for the decline in these shellfisheries are complicated by such possible factors as overharvest by humans and deterioration of habitat quality, biologists generally accept the notion that sea otters cannot co-exist with commercial shellfisheries due to their effectiveness as predators. Sea otters consume about 25 percent or more of their body weight each day. Because of the adverse effects that sea otters can

have on shellfisheries, any recovery action that would promote range expansion or establishment of additional colonies is opposed by many shellfishery advocates.

The second major contemporary issue concerns the accidental entanglement and drowning of sea otters in commercial gill and trammel nets placed in nearshore waters for harvest of halibut. This problem was not recognized either at the time the sea otter was listed (January 1977) or even when the recovery plan was approved (February 1982). Evidence obtained later in 1982 indicated that many non-target species, such as seabirds and marine mammals (including sea otters) were being taken incidental to the fishery. A monitoring effort was initiated that year by the California Department of Fish and Game (CDFG) to document the extent of the losses. By late 1984, the documentation was sufficient, the data analyzed, and a conclusion reached that between 1982 and 1984 an average of 80 sea otters per year, or about 6 percent of the population per year, had been accidentally drowned in commercial fishing nets. The analysis further indicated that, during the period of 1973 to 1983, annual sea otter deaths from drowning probably ranged from 49 to 168. State and FWS biologists concluded that these losses were large enough to have prevented the population from growing for the past 10-15 years.

A series of temporary and permanent closures to this type of fishing within waters 15 fathoms or less in depth were put into effect by the State in 1985, and they appear to have reduced the incidental entanglement of sea otters by about 40 percent. On September 28, 1986, the State of California promulgated regulations putting into effect additional closures in some waters out to 20 fathoms in order to further reduce sea otter drownings. These restrictions also adversely affected a significant portion of the central coast halibut fishery; therefore, the legislation also contains provisions for providing low interest loans to fishermen to allow them to switch to alternative gear.

The potential conflict between sea otters and OCS oil development stems from the risk of oil spills associated with such development and the requirement under Section 7 of the Endangered Species Act that no Federal agency shall permit, fund, or carry out any activity that is likely to jeopardize the continued existence of a listed species in the wild. Both the oil industry and the Interior Department's Minerals Management Service (MMS) consider the California OCS as having some of the highest potential for producing oil in the nation. Within California, the Santa Barbara Channel-Santa Maria Basin, which extends from just inside the present sea otter range southward through the area expected to be reoccupied by otters over the next 10-20

years, is the main area of interest for oil development.

Section 7 consultations during the past 2 years on OCS development in the southern and central Santa Maria Basin and a single platform in the northern Santa Maria Basin (abreast of the sea otter range) concluded in "no jeopardy" biological opinions. These opinions were based on a comprehensive sea otter risk analysis and on modeling conducted for the consultations. However, a consultation on potential development of six additional platforms in the northern Santa Maria Basin completed in August of this year concluded that, when added to the already existing (baseline) risks from OCS development, tanker accidents, and incidental losses in fishing nets, development of the additional platforms would likely jeopardize the continued existence of the southern sea otter. The opinion offered a reasonable and prudent alternative of incrementally evaluating each of the hypothetical platforms, if and when a development plan for any of them is actually submitted for consideration.

Listing and Recovery Program

The sea otter is particularly vulnerable to contamination of its fur because, unlike other marine mammals, it has no layer of blubber to insulate its body from the chill of the ocean. Instead, it depends on an extraordinarily high metabolic rate and on its unusually dense underfur, which traps an insulating layer of air, to maintain its body temperature. Oil spills along the central California coast are of special concern because studies have indicated that if 25-30 percent or more of a sea otter's pelage is coated with oil, it will lose its insulating properties and the animal will likely die of hypothermia.

It was because of its small population size, greatly reduced range, and vulnerability to accidental oil spills that the FWS listed the southern sea otter in 1977 as "Threatened." It was a time when transportation of crude oil from Alaska's North Slope was just beginning, oil and gas development on California's OCS was only being talked about, and incidental take of otters in commercial fishing nets was not even recognized as a potential problem.

A recovery plan was prepared and approved in February 1982. The goals cited in the plan are to: (1) minimize the risk of oil spills from tanker accidents and other sources; (2) establish at least one additional breeding colony outside the present range; (3) minimize vandalism, harassment and incidental take; (4) monitor recovery progress; and (5) integrate the recovery plan into plans of local coastal community governments.

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Sea Otter

(continued from page 13)

Recovery is beginning to move forward on several fronts. Studies funded by MMS are under way to test potentially effective methods for capturing, cleaning, and rehabilitating oiled otters, and for moving otters out of the path of oil slicks. Major investigations are proceeding in an effort to better document the population dynamics, movements, and behavior of the current California population in order to understand the possible effects of an oil spill on the population. The problem of incidental take in commercial fishing nets has been documented, and remedial measures taken by the State have resulted in a substantial drop in this source of mortality.

Oil spill risks, both from tankers and OCS development, have been analyzed and quantified. The FWS' initial estimate of the high risk of tanker spills has been verified through recent comprehensive modeling studies. In fact, MMS has estimated that about 3.7 tanker spills will occur over the next 30 years within or adjacent to the current sea otter range. The tanker risk translates into a nearly 5 percent chance that greater than 20 percent of the current California sea otter population will die as a result. Although the odds are lower, about 1 chance in 67, some 40 percent of the sea otter population could be lost due to tanker spills over the next 30 years. Oil spill risks from OCS development, if it expands closer to and penetrates the sea otter range, will further increase the overall

risk of oil spill damage to the sea otter population.

Since minimizing the actual risk of oil spills is difficult, especially those resulting from tanker accidents, the FWS has placed great emphasis on the recovery goal of minimizing the effects of oil spills. Of special importance is the FWS' current proposal to establish an experimental population of southern sea otters at a location within the historic range, but distant enough from the current range that a single large oil spill or similar event would not affect both populations simultaneously.

* * *

End of part one. Next month's conclusion outlines the proposal to establish an experimental population of sea otters at San Nicolas Island.

Endangered Wildflower Calendar

The 1987 *Endangered Wildflower Calendar* is now available from the American Horticultural Society (AHS). This 8½-by 23-inch wall calendar features full-color photographs of 16 rare American wildflowers, individual summaries on their status, and general information on endangered plants. Proceeds from the calendar sales enable the AHS to award up to \$250 to non-profit organizations whose members or supporters provide information on the rediscovery of plants generally thought to be extinct. To order, send \$6.95 per calendar (\$6.25 for AHS mem-

bers) to Jeanne Eggeman, AHS, P.O. Box 0105, Mount Vernon, Virginia 22121. For orders of 3 or more calendars, send \$6.45 for each (\$5.75 for AHS members). These prices include postage and handling, but Virginia residents should add 4 percent sales tax.

For the AHS list of plants that are considered extinct, send a self-addressed business-sized envelope and \$1.00 for postage and handling to the Wildflower Rediscovery Project at the same address.

We Still Need Your Help

Your response to our calls for additional articles on endangered species research and management activities has been gratifying. We invite you to continue sending us such reports, along with photographs or drawings. Your ideas and comments on how to make the BULLETIN more effective also are most welcome.

Habitat Rehabilitation on the Tennessee-Tombigbee Waterway

Andrew C. Miller and Jack C. Mallory
U.S. Army Corps of Engineers

In a unique cooperative project planned by the U.S. Army Corps of Engineers (COE) and the Fish and Wildlife Service, scientists from the COE's Waterways Experiment Station (Vicksburg, Mississippi) and Mobile District (Mobile, Alabama) have designed a segment of rehabilitated habitat for freshwater mussels, aquatic insects, and fishes that require shallow, rapidly flowing water and gravel substrate. Although the project was initiated to reconstruct a segment of the habitat lost to the Tennessee-Tombigbee Waterway, it was not required and was not part of a mitigation agreement. The habitat, prepared with 25,000 cubic yards of 1- to 3- inch gravel, was placed below a minimum flow release structure in the Columbus Dam, which passes 200 cubic feet of water per second into a bendway of the Tombigbee River.

The habitat was designed so that the gravel would constrict the river to create

a flow velocity of 1.5 feet per second and provide substrate for aquatic organisms. After more than one year, the gravel bars have remained stable and show no evidence of erosion or excessive sediment accretion. Thirty-one species of aquatic invertebrates, including immature mayflies, caddisflies, stoneflies, small clams, and crustaceans, have been collected from the habitat. The presence of these organisms, along with the crystal darter (*Ammocrypta asprella*), which is listed by the State of Mississippi as endangered, and the uncommon blue sucker (*Cyprinus elongatus*), indicates that a diverse aquatic community is developing. Both of these fishes are Category 2 candidates for future listing under the Endangered Species Act.

Biologists and planners of the COE are interested in exploring the possibility of transplanting individuals of the freshwater mussel *Epioblasma (Dysnomia) penita*, recently proposed for Federal listing as

Endangered (*Editor's note: see BULLETIN Vol. XI No. 5*), to this site. Currently, this mussel is found in the nearby Buttahatchie River, where it inhabits clean gravel substrate in rapidly flowing water.

It is hoped that data from the Columbus Dam site will help planners and engineers rehabilitate areas that have been altered by human activities and provide habitat for organisms that are becoming uncommon in large waterways. In addition, it is a unique outdoor laboratory where growth and behavior of organisms living under precisely designed physical conditions can be studied.

For more information, telephone Andrew Miller of the COE Waterways Experiment Station (commercial 601/634-2141, FTS 542-2141), or Jack Mallory of the COE Mobile District (205/690-2723, FTS 537-2723).

Biologists Study Group of Prairie Crayfish

James H. Stewart

Jackson, Mississippi, Endangered Species Field Office

Biologists with the Jackson Endangered Species Field Office are investigating the status of a group of prairie crayfish related to *Procambarus hagenianus*, an apparently common species. The other species *P. barbiger*, *P. cometes*, *P. connus*, and *P. poqum*, are known from limited collections, and their decline is related to extensive alteration of prairie habitat.

All five species occur in Mississippi and Alabama. These crayfish are primary burrowers, and they depend on their burrows throughout their entire life cycle. The historic and ideal prairie habitat for hagenianus crayfish is described as an upland area of alkaline soil with native grasses and herbs and a low tree density. Prairies where hagenianus crayfish occur are probably preclimax communities maintained by fire and soil conditions. Many former prairies have been converted to row crops, pastures, and forest, and other prairie habitat has been degraded by overgrazing, erosion, and invasion by non-native species. Prairie remnants in many cases are now confined to field edges, and to highway and railroad rights-of-way where burning or mowing controls woody vegetation. The U.S. Forest Service (USFS) owns some small prairies as well as two prairie areas within Bienville National Forest in Mississippi.

P. barbiger is known from three populations in the Jackson Prairie in east cen-

tral Mississippi. A recent survey of the species uncovered a second population in Scott County and a small, apparently declining, population in Newton County. The search of over 25 prairies has failed to find other populations. Observations indicate that this species does not tolerate disturbance of the surface soils. Prairie soils that have been row cropped, converted to pasture, or otherwise disturbed, then allowed to revert back to prairie, apparently do not support this species. For instance, one large reestablished prairie, maintained by the USFS, meets all of the known habitat requirements of *P. barbiger*, yet the species does not exist there. Two of the three currently known populations occur on USFS land. One of these small sites is a typical prairie with little wooded vegetation; the other has a very limited open prairie that is being encroached upon by red cedar and pine trees, although *P. barbiger* still exists among the scattered red cedar. Biologists have been unable to trap the specimen within the pine trees. The third known *P. barbiger* population occurs within an area of approximately one acre located between a road and a pasture. About half of this site is mowed during right-of-way maintenance, while the remainder is grazed lightly.

P. barbiger apparently is declining because of habitat impacts and the encroachment of a competing crayfish spe-

cies. The lack of historic information is partially the result of this species' habits. *P. barbiger* only surfaces to feed and breed during very wet periods and generally at night. Since *P. barbiger* is believed to burrow 15 to 20 feet or more, the only feasible survey method is trapping the crayfish when they surface. Using a trap in the entrance of the burrows has been successful during wet weather. If funding becomes available, more surveys of *P. barbiger* will be conducted.

More adaptable than the other species, *P. hagenianus* is known from seven counties in Mississippi and three counties in Alabama. This species occurs in cultivated prairie soils, and once it was so abundant that it was an agricultural pest to row crops. Three other species of hagenianus crayfish are more uncommon. *P. cometes* is known from three sites in the flatwoods belt of Oktibbeh, and the black belt of Lowndes Counties, Mississippi. The most recent collection of this species was in 1968. Neither *P. connus* nor *P. poqum* have been collected in 50 years. *P. connus* is known from only one location in Carroll County, Mississippi, in an area of brown loam and thick loess soils. *P. poqum* is known from only two sites in Chickasaw County, Mississippi, in the upper coastal plain of Tibbie Creek.



Procambarus barbiger from Scott County, Mississippi, site of a new population discovered in 1986.

Regional News

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she was put in quarantine prior to incorporation into the captive breeding program. Blood samples taken from the bird and analyzed by the National Wildlife Health Center in Madison, Wisconsin, revealed relatively low levels of lead. As of October 1, three male California condors remained in the wild.

The second egg from the 1986 breeding pair of California condors was brought into captivity for incubation on April 15 and hatched with assistance on June 6 at the San Diego Wild Animal Park. The hatching of this chick and the capture of this parent brings the number of California condors in captivity to 24.

On June 23-25, the FWS and the Upper Mississippi River Conservation Committee sponsored a two-day resource issue assessment of the freshwater mussel die-offs in the eastern United States. Over 80 representatives from the FWS, State and Federal resource conservation agencies, and private organizations participated. No apparent causes of the die-offs surfaced; however, most participants felt the areas of disease, contaminants, and population ecology should be the focus of future research efforts. Abstracts of the technical sessions can be obtained from the Office of Information Transfer, 1025 Pennock Place, Suite 212, Fort Collins, Colorado 80524. Copies of the proceedings will be available in early 1987.

A male Kirtland's warbler (*Dendroica kirtlandii*) that Patuxent Wildlife Research Center (PWRC) biologists banded in

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	61	16	141	3	2	0	223	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	5	0	80	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	101	6	1	24	3	2	137	46
TOTAL	276	52	466	74	14	37	919	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 27 animals
38 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

August 31, 1986

February 1985 in the Bahamas has been sited for two consecutive years on both its wintering and breeding grounds. During winter 1986, the warbler was sited and studied extensively at the same location on the island of Eleuthera, where it was banded the previous winter. In July 1986, the warbler was sited again on the species' breeding territory in Michigan. The bird mated this year and the pair fledged a brood in July. This suggests

that the male probably arrived at the breeding grounds no later than the last week of May.

On August 13, a Kirtland's warbler was captured and radio-tagged by wildlife biologists in Crawford County, Michigan. This event makes the first time a Kirtland's warbler has been radio-tagged. The bird, a young-of-the-year male, weighed 14 grams (0.45 ounce) and appeared to be in good condition.

August-September 1986

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program Washington D.C. 20240

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ENDANGERED SPECIES

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Endangered Species Program, Washington, D.C. 20240

Protection Proposed for Butterfly and Two Plants

During September 1986, the following taxa were proposed by the Fish and Wildlife Service (FWS) for listing under the Endangered Species Act:

Pawnee montane skipper (*Hesperia leonardus montana*)

This rare brownish-yellow butterfly, endemic to a small mountainous area in central Colorado, was proposed September 25 for listing as a Threatened subspecies. Its limited habitat already has been damaged by off-road vehicle (ORV) use, and up to half of what remains could be eliminated by a proposed reservoir.

Pawnee montane skippers are small, with a wingspan of slightly over one inch (2.5 centimeters), and they complete their life cycle within a single year. Their flight period begins in mid to late August, the adults spending most of their short existence mating and feeding. They secure nectar from several plants, such as the musk thistle (*Carduus nutans*), the Canada thistle (*Cirsium arvense*), an unidentified native thistle, a native pink-flowered *Cirsium*, *Monarda* sp., *Chrysopsis*, and the prairie gayfeather (*Liatris punctata*); their larval food plant is blue grama grass (*Bouteloua gracilis*).

The only places from which the Pawnee montane skipper is known are sites within an area roughly 23 miles (37 kilometers) long and 5 miles (8 km) wide in the South Platte River drainage of Colorado's Front Range. Much of the available habitat is within Pike National Forest; the rest is privately owned. Skippers usually are found within one mile (1.6 km) of a stream on steep, open, ponderosa pine woodlands.

ORV use within the butterfly's range has led to accelerated soil erosion, resulting in the loss of food plants. Other habitat damage may have occurred when Cheesman Reservoir was constructed and when communities within the skipper's range were developed. However, the main threat to the remaining skippers is the proposed Twin Forks Reservoir. Estimates of the amount of butterfly habitat that would be inundated range up to 50 percent, depending on the final impoundment size. Construction activities (roads, access points, maintenance facilities, etc.) and recrea-

tional development associated with the Twin Forks project could further degrade or eliminate even more of the habitat unless located away from prime skipper areas.

A U.S. Army Corps of Engineers (COE) permit would be needed for the Twin Forks project. While additional research is being conducted to better determine the degree of threat to the skipper from the planned reservoir, the FWS will work with the COE, the U.S. Forest Service, and all other involved parties in an effort to conserve the butterfly and its habitat while accommodating project goals to the greatest extent possible. Because printing the maps and detailed habitat descriptions required for a Critical Habitat proposal would make the skipper more vulnerable to collectors, such a designation was not deemed prudent at this time; however, a listing of the butterfly as Threatened would give it and its habitat protection under Section 7 of the Endangered Species Act.

Two Puerto Rico Plants

Cyathea dryopteroides (elfin tree fern) and *Ilex cookii* (Cook's holly), two plants endemic to elfin or cloud forests in the mountains of central Puerto Rico, were proposed for listing as Endangered (F.R. 9/26/86). Both species, which occur within small areas and in very low numbers, are in danger of extinction through direct destruction of the plants and loss of habitat.

A small tree fern, *C. dryopteroides* reaches only 24 inches (60 cm) high with a trunk one inch (2.5 cm) in diameter. It currently is known from populations totalling about 70 individuals on two mountaintops that are approximately 12 miles (20 km) apart. *I. cookii*, an evergreen shrub or small tree, has elliptical leaves that are leathery and dark green on the upper surface. It is thought to be dioecious, and therefore dependent on the existence of both male and female plants in close proximity to each other. The fact that male flowers and ripe fruit have never been observed suggests that production of viable seed rarely occurs. At present, only a single 8-foot (2.5 meter) *I. cookii* specimen with 4 small root sprouts has been documented from one of the species' two known mountaintop sites, and a small

number of sprouts or seedlings have been seen at the other.

Although both species occur on lands that are owned by the Commonwealth of Puerto Rico and managed as units of the Commonwealth Forest System, some sites on peaks and ridges have been cleared for construction after being leased to communications companies. A significant portion of the total *C. dryopteroides* population was destroyed by the development of a single communications installation on Monte Jayuya, and it is likely that some *I. cookii* individuals were lost when a similar facility was built on Puerto Rico's highest mountain, Cerro de Punta. Construction of new facilities, or even expansion of existing ones, could further deplete the surviving populations of *C. dryopteroides* and cause the extinction of *I. cookii*. Forests inhabited by both species also have been used as military training areas, resulting in additional damage to the relatively fragile habitat. Road construction and the indirect effects of such work (e.g., slope instability) in the vicinity could pose further threats.

Both species are attractive and could have potential value as ornamental plants; moreover, considerable commercial trade in some tree fern species already exists. Accordingly, the FWS decided against pointing out the location of the surviving populations with a designation of Critical Habitat. If they are listed, however, the plants and their habitat will receive Section 7 protection against jeopardy from Federal activities. The only Federal agencies whose actions might be expected to affect the plants are the U.S. Army (military exercises) and the Federal Highway Administration (road construction and maintenance). Through careful planning, adverse impact to the two species should be minimal.

* * *

Available Conservation Measures

Among the conservation benefits provided to a species if its listing under the Endangered Species Act as Threatened or Endangered is approved are: protection from adverse effects of Federal activities; prohibitions against certain practices; the

(continued on page 7)



Regional News

Endangered Species Program regional staff members have reported the following activities for the months of September and October:

Region 1--Numerous specimens of the golden paintbrush (*Castilleja christii*) were

found recently on U.S. Forest Service (USFS) lands near Mount Harrison in central Idaho. The Conservation Agreement made with the USFS a few years ago as an alternative to listing the species ap-

pears to have successfully eliminated the threats to its survival.

The World Center for Birds of Prey (The Peregrine Fund) reported that three peregrine falcons (*Falco peregrinus*) were fledged at a nest site near Cascade, Idaho. At two other sites, however, six young were lost to golden eagle predation.

The Fish and Wildlife Service (FWS) met with representatives of the U.S. Army Corps of Engineers and Port of Coos Bay at Senator Hatfield's Portland Office to discuss the results of peregrine falcon surveys that were done in conjunction with plans for a new road corridor to the north of Coos Bay. The FWS concluded that the surveys were adequate to allow an assessment of project impacts, and the Corps indicated that it would likely request formal consultation when a public notice is issued for the project.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska. **Region 8**: Research and Development nationwide.

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Various species of fish upon which the Endangered bald eagle (*Haliaeetus leucocephalus*) preys were collected from the Willamette River in northwest Oregon. Samples will be sent to FWS laboratories to determine the levels of chlorinated hydrocarbons, trace elements, and polychlorinated biphenyls (PCB's) in these fish. These samples have been collected as part of a study to determine why the breeding success of bald eagles in the Willamette River area is lower than the State average. FWS staff conducted the sampling in conjunction with Oregon Cooperative Wildlife Research Unit personnel.

A 32-foot boat will be transferred from Alaska to Region 1 for southern sea otter (*Enhydra lutris nereis*) law enforcement. The boat, appropriately named "R/V Sea Otter," will be needed to protect the otters if and when the translocation to San Nicolas Island is made, but a more immediate need is to investigate illegally set gill nets near Monterey, California. Apparently, nets are being set in closed areas (less than 15 fathoms) at night and being pulled before dawn. A number of otters have been found on the beach over the last 5 weeks that, according to State biologists, appear to have drowned in fishing nets.

The Hoover Dam refugium population of Devil's Hole pupfish (*Cyprinodon diabolis*) has been rather stable since the early 1970's, and its size has ranged from 35 to 75 individuals. Recently, however, the population declined to less than 10. Nevada Department of Wildlife personnel captured the remaining few individuals and

(continued on page 7)

Listings Approved for Four Animals and Five Plants

During September and October 1986, the following animal and plant taxa were added to the *U.S. List of Endangered and Threatened Wildlife and Plants*:

Concho Water Snake

The Concho water snake (*Nerodia harteri paucimaculata*) is a rare, non-venomous subspecies endemic to sections of the Concho and Colorado Rivers in west-central Texas. Because the proposed Stacy Reservoir would inundate parts of its free-flowing riverine habitat and dry out other parts, the snake was proposed January 22, 1986, for listing as Threatened (see story in BULLETIN Vol. XI No. 2). The final listing rule was published in the September 3, 1986, *Federal Register*. A final decision on designating Critical Habitat was delayed pending further review, but the decision should be published no later than January 1988. In the meantime, Fish and Wildlife Service (FWS) biologists are working with the project sponsors in an attempt to find a way to accommodate project goals while ensuring the snake's conservation.

Nashville Crayfish

Apparently extirpated from three other watersheds, the Nashville crayfish (*Orconectes shoupi*) currently is known to survive only in the Mill Creek drainage within Davidson and Williamson Counties, Tennessee. Degradation of water quality resulting from urbanization threatens the crayfish with extinction, and the FWS proposed January 24, 1986, to list it as Endangered (see summary in BULLETIN Vol. XI No. 2). The final listing rule was published in the September 26 *Federal Register*.

Dismal Swamp Shrew

A rare subspecies of the southeastern shrew (*Sorex longirostris*), the Dismal swamp shrew (*S. l. fisheri*) essentially is restricted to the Dismal Swamp National Wildlife Refuge in southeastern Virginia and adjacent portions of the swamp in North Carolina. The swamp has undergone extensive environmental changes in the recent past—in fact, the original swamp (more accurately described as a wooded peat bog) has been reduced in size by roughly 85 percent since the turn of the century. Some of these changes favored a related subspecies (*S. l. longirostris*), which is more common and is invading the Dismal Swamp shrew's habitat. Interbreeding between the two would render the Dismal Swamp shrew genetically extinct. For this reason, *S. l. fisheri* was proposed on July 16, 1985, for listing as Threatened (see BULLETIN Vol. X No. 8).

The final rule was published September 26, 1986. An overall management plan for the refuge is under development, and it will incorporate management practices to benefit the Threatened shrew.

Loach Minnow

A small desert fish, the loach minnow (*Tiaroga cobitis*) once occurred in the Gila River system upstream of Phoenix in Arizona, New Mexico, and Mexico (State of Sonora). This species, however, has been extirpated from Mexico and reduced to a fragmentary distribution in the remainder of its range. Impoundments, water diversions, ground water pumping, channel downcutting, and sedimentation have degraded or completely eliminated much of the historical habitat. The spread of exotic predatory and competing species also has played a part in the loach minnow's decline. These factors continue to threaten the fish. Accordingly, it was proposed June 18, 1985, for listing as Threatened (see BULLETIN Vol. X No. 7), and the final rule was published in the October 28, 1986, *Federal Register*. A decision on the original Critical Habitat proposal has been postponed until June 1987 in order to gather additional data on economic impacts.

Hawaiian Plant

Abutilon menziesii, also known as the ko'olua'ula, is a vulnerable species of shrub that apparently has been reduced in numbers to three small populations on Lana'i, Maui, and O'ahu in the Hawaiian Islands. Approximately 65 plants are known to survive in the wild. Much of the habitat in which this plant once grew was cleared for agriculture, with these lands often abandoned in subsequent years. Erosion has been, and continues to be, a major threat. The species also faces danger from fire, flooding, overgrazing by feral livestock, and defoliation by the introduced Chinese rose beetle (*Adoretus sinicus*). The plant was proposed on July 16, 1985, for listing as Endangered (see BULLETIN Vol. X No. 8), and the final rule was published September 26, 1986.

Alabama Leather Flower

The Alabama leather flower (*Clematis socialis*) is a rare perennial plant known from two very small sites along roadsides and adjacent woodlands in St. Clair and Cherokee Counties, northeastern Alabama. It is believed to be extremely vulnerable to extinction because of its restricted range and proximity to highways. Threats to its survival include herbicide application and mechanical scraping associated with roadside right-of-way maintenance, en-

croaching development, logging, and conversion of habitat to pasture. This plant was proposed December 6, 1985, for listing as Endangered (see BULLETIN Vol. XI No. 1), and the final rule was issued September 26, 1986. Highway crews are now working with the FWS at both sites to find rights-of-way maintenance techniques that are compatible with conservation of the leather flower.

Three Florida Shrubs

The beautiful pawpaw (*Deeringothamnus pulchellus*), Rugel's pawpaw (*D. rugelii*), and four-petal pawpaw (*Asimina tetramera*) are shrubs that have disappeared from most of their historical range, and now can be found only in a few small areas of southern Florida. Much of the remaining habitat of these plants is vulnerable to urbanization and other changes. All three were proposed for listing on November 1, 1985 (see BULLETIN Vol. X No. 11), and they were listed as Endangered on September 26, 1986.

* * *

These listed animals and plants are now protected under the Endangered Species Act, the terms of which are summarized in this BULLETIN at the end of the story on species newly proposed for listing.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313 763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

Correction

The photograph of the jaguarundi in BULLETIN Vol. XI No. 8-9 should have been credited to Curtis Carley. We regret the error.

Changes in Grizzly Bear Regulations

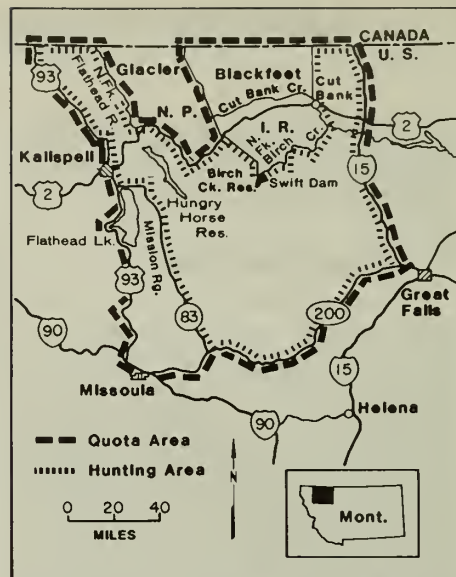
A revision of the special regulations for management and protection of the Threatened grizzly bear (*Ursus arctos*) in the conterminous United States was published recently by the FWS (F.R. 9/23/86). It involves: (1) a new requirement to report taking of grizzlies to regional FWS agents and to Indian Tribal authorities; (2) the addition of Tribal authorities to those persons allowed to take grizzlies under specified conditions; (3) a stipulation that grizzlies taken in self-defense cannot be possessed or moved, except by authorized Federal, State, or Tribal personnel; and (4) an adjustment of the boundaries and quotas for the State grizzly hunting season in northwestern Montana.

The first three of the above changes were designed to facilitate monitoring of bear deaths and to recognize the role of Tribal authorities in grizzly management. The fourth adjusts the previous grizzly hunting regulations. Current data indicate that grizzlies in certain parts of northwestern Montana are declining and should not be hunted, but that increasing grizzly numbers elsewhere are leading to problems that pose a risk to the main grizzly population. Therefore, the revised rule stops hunting in some areas, opens it in others, and prohibits it altogether once the known total number of grizzlies killed in one year from all human-induced causes within the range of the main population (exclusive of Glacier National Park) reaches 14, or once the number of female grizzlies killed reaches 6.

Background

The grizzly bear originally occurred throughout western North America from Alaska to central Mexico. Its populations in the conterminous U.S. are now apparently restricted to northwestern and northeastern Washington, northern and eastern Idaho, western Montana, and northwestern Wyoming (Yellowstone Ecosystem). Fewer than 1,000 individuals are thought to survive in these areas, most of them in northwestern Montana. On July 28, 1975, the FWS listed the grizzly in the conterminous U.S. as Threatened. Special regulations issued in conjunction with that determination, as incorporated into 50 CFR 17.40(b), provided general protection to the species, but allowed taking under certain conditions to defend human life, eliminate nuisance animals, and carry out research. In addition, a limited sport hunting season was authorized in a specified portion of northwestern Montana, which has the largest grizzly population in the conterminous 48 States. Hunting was to cease when 25 grizzlies were killed in any one year for any reason.

These grizzlies belong to the Northern Continental Divide Ecosystem (NCDE), which includes Glacier National Park; the Flathead National Forest and adjoining portions of the Helena, Kootenai, Lewis and Clark, and Lolo National Forests (including the Bob Marshall, Great Bear, Mission Mountains, and Scapegoat Wilderness Areas); and some adjacent Bureau of



Hunting of grizzly bears will be prohibited under the new regulations once the number killed within the quota area each year from all human-induced causes reaches 14, or once the number of female grizzlies killed reaches 6. Hunting, however, will be limited to a somewhat smaller area within the overall quota zone.

Land Management, State, private, and Indian Reservation lands. Based on a number of recent studies, the Montana Department of Fish, Wildlife and Parks has estimated the grizzly bear population of the NCDE to contain 549 individuals, of which 356 are found outside of Glacier National Park.

The FWS continues to believe a hunting season to be necessary in order to make the bears in the NCDE more wary, thereby reducing the number of grizzly/human conflicts. Such problems have been on the rise in the eastern front of the Rocky Mountains in Montana, and the trapping and relocation of depredating bears has met with only limited success. Meanwhile, the grizzly population to the west in the Mission Mountains is declining. Therefore, the hunting regulations were revised to eliminate hunting of grizzlies in the Mission Mountains while opening up more of the Rocky Mountain Front. Hunting remains prohibited in Glacier National Park.

In order to achieve recovery of the grizzly bear in the NCDE, hunting levels must be kept within certain limits designed to allow for an increase in the overall grizzly population. Computer simulations indicate that, if 6 percent of the NCDE grizzly population (21 bears) dies each year from human-related causes, the population can still experience a general increase in numbers. When the estimated illegal take of seven grizzlies annually was subtracted, the annual legal kill limit for the NCDE was set at 14 grizzlies.



In order to reduce the likelihood of female grizzly bears being shot, there will be no hunting under the new regulations of adult grizzlies accompanied by young, as such grizzlies would probably be female.

New Hope for the Southern Sea Otter

*Editor's note: A proposal to establish an experimental population of the southern sea otter (*Enhydra lutris nereis*), now listed as Threatened, was published in the August 15, 1986, Federal Register. In last month's BULLETIN, Wilbur (Skip) Ladd, Project Leader of the FWS Office of Sea Otter Coordination in Sacramento, California, gave an overview of the events leading up to the sea otter translocation proposal. The following conclusion of his account highlights the proposal itself.*

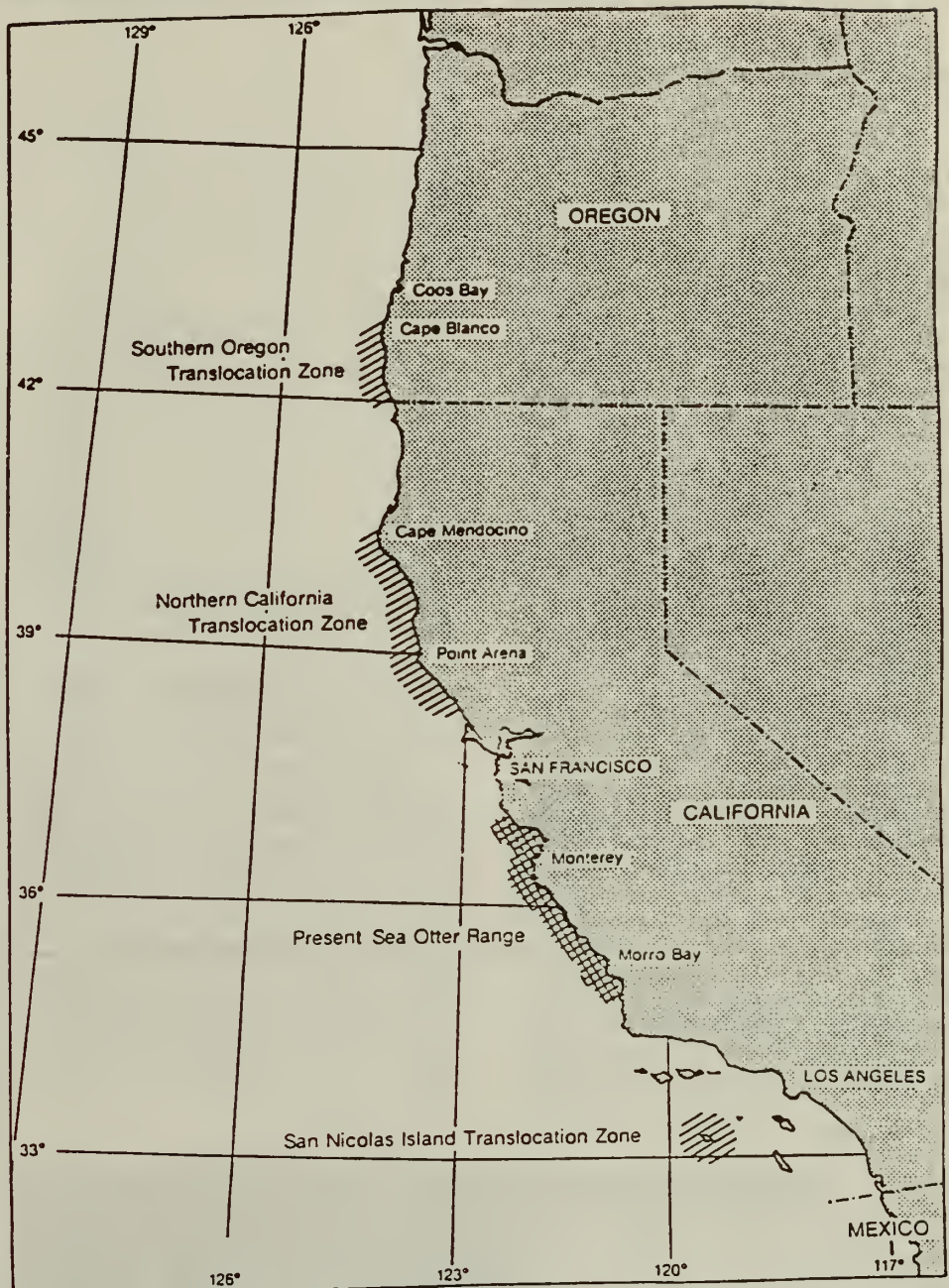
The very suggestion of establishing a second population of sea otters off California stimulated a great deal of public interest across the State. For this reason, the Fish and Wildlife Service (FWS) embarked years ago on an arduous public involvement process, which began in 1981. The FWS, working through a private contractor, synthesized as much information as possible on all potential translocation sites along the continental West Coast. Representatives from all major agencies and interest groups were included in a technical review team. The so-called "mapping study" summarized the available data on habitat suitability, potential conflicts with shellfisheries, oil spill risks from offshore oil development and tanker transportation, the capability of the habitat to serve as a natural barrier to dispersal of otters (i.e., to contain the new population), ease of protecting and conducting research on a new colony, and historical presence and abundance of sea otters.

Four zones were identified as having the greatest potential for a successful translocation: 1) San Nicolas Island, the most distant of the Channel Islands off southern California; 2) the northern coast of California; 3) the southern coast of Oregon; and 4) the northern coast of Washington. The study was completed and published in 1984.

In June 1984, the FWS also officially kicked off the National Environmental Policy Act process by publishing a Notice of Intent to prepare an Environmental Impact Statement (EIS) and proposed rule for establishing an experimental population of southern sea otters. Next, public scoping meetings were held. All major interest groups—including environmental organizations, the oil industry, and sport and commercial fisheries interests—were represented on an interagency review team and were provided with preliminary drafts of the EIS and proposed rule upon which to comment. The review process has been most interesting, and has taken all of 2 years to get to where we are now.

Translocation Proposal

So where are we now? On August 15, 1986, the notice of availability of the draft EIS and the proposed rule to establish an experimental population of California sea



location of southern sea otter's current range (crosshatched) and potential translocation sites

otters at San Nicolas Island were published in the *Federal Register*.

The proposal looks like this: Beginning in August 1987, FWS National Ecology Center biologists, in conjunction with biologists from the California Department of Fish and Game, would move (or "translocate") up to 70 mostly immature California sea otters from the current population to San Nicolas Island, the preferred site. The initial group would be closely monitored and, if a substantial number were to disperse from the island or die, additional otters may be transported there in subsequent years. No more than 70 would be taken from the donor population in any one year, and no more than 250 in total would be moved, although it is highly unlikely that

anywhere near this maximum number would ever be translocated. A law enforcement patrol officer would be assigned to protect the new colony full time, at least for the first 3 to 5 years after the translocation effort begins.

Once the otters are at the island, an intensive, long-term research effort would be carried out to document population dynamics of the experimental population as it grows toward the carrying capacity of the habitat, which is estimated to be somewhere between 280 and 1,000 animals. Concurrently, a variety of studies would be conducted to document changes in the nearshore marine ecosystem, such as effects on shellfish species composition

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Sea Otter

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and population size, changes in the kelp forest, and impacts on associated populations of finfish.

One purpose of such a translocation project, in addition to establishing a reserve sea otter breeding colony for recovery purposes, is to better document the characteristics of a sea otter population when it is within its "optimum sustainable population" level. This is important because sea otters are also protected under the Marine Mammal Protection Act (MMPA), which requires that populations be restored to their optimum sustainable levels consistent with maintaining the health and stability of the marine ecosystem. In order to determine the optimum sustainable population for California sea otters, information is needed on habitat carrying capacity and maximum productivity. If San Nicolas is ultimately selected as the translocation site, the research could be carried out in an almost perfect natural laboratory.

Sea Otter Containment

Another critical component of the translocation proposal is the FWS commitment to contain the experimental sea otter population at San Nicolas. Because of the potential for otters diminishing important commercial and sport shellfisheries in other parts of southern California, as well as adversely affecting other uses of the area (such as oil development), the proposal includes a designated management (or "no otter") zone. In simple terms, this means that any sea otter found in near-shore waters off southern California south

of Point Conception, including all the islands of the southern California Bight (except San Nicolas) and the mainland coast to Mexico, would be removed using non-lethal means, and either placed back into the translocation zone at San Nicolas or into the range of the donor population along the central coast. This containment effort would minimize adverse impacts of the translocation on shellfisheries; however, it also would prevent the natural range expansion of the current population into southern California. It is expected that the range of the current population would otherwise reach southern California through natural expansion within 10 to 20 years.

This containment strategy amounts to a form of "zonal management," a strategy that the State, the Marine Mammal Commission, and many fisheries advocates have been urging the FWS to undertake. The trade-off: a reserve sea otter colony established at San Nicolas but no natural reoccupation of historical habitat in the remainder of southern California.

Proposed Translocation Site

San Nicolas Island is believed to be almost ideal for sea otter containment as well as research. Located 62 miles (100 kilometers) offshore, it is separated from the mainland and the other Channel Islands by wide, deep ocean expanses that are generally devoid of sea otter food within normal foraging depths (15-20 fathoms). It is also 24 miles (39 km) from the tiny island of Santa Barbara and over 40 miles (64 km) from the northern Channel Islands, where much of the important southern California shellfishing takes place.

Rich in shellfish resources itself, San Nicolas would provide excellent habitat for a new sea otter colony. This, however, is precisely why some people are opposed to moving otters there. San Nicolas supports healthy commercial and sport fisheries that we predict will be significantly reduced or lost once the otters occupy the near-shore habitat around the island. The combined net value of these fisheries is conservatively estimated to be nearly \$200,000 per year, which represents about 11 percent of the abalone and lobster fishery and 2 percent of the sea urchin fishery of southern California. Fishermen contend that even this figure far underestimates the value of the fishery.

On the plus side of the economic ledger, marine scientists speculate (with some evidence) that sea otter predation on the expansive populations of sea urchins will reduce heavy urchin grazing on kelp. This could allow new kelp beds to flourish and provide not only a larger crop of kelp for commercial harvest but also a much greater diversity and number of finfish and other species associated with the kelp forest community. In fact, marine ecologists preparing the draft EIS on translocation have calculated that the kelp canopy around San Nicolas may increase by 45 percent or more with sea otter reintroduction.

Legal Authority

Translocations of listed species are authorized under the terms of Section 10(j) of the Endangered Species Act (ESA), which addresses the establishment of experimental populations. However, Congress recently passed legislation (PL 99-625) that specifically authorizes and sets the ground rules for translocation of California sea otters. The key points are that the FWS must develop a translocation plan by regulation that includes the following: (1) the number, age, and sex of sea otters to be located; (2) the methods for capture, translocation, release, monitoring, and protection; (3) the specification of a "translocation zone" where otters will be relocated, plus a buffer area, with formal Section 7 consultations required in the zone for all Federal activities except those that are defense-related (the U.S. Navy controls San Nicolas); (4) the specification of a "management zone," which would surround the translocation zone but would not include the existing sea otter range or adjacent areas where expansion is needed for the species' recovery; (5) measures, backed up by an adequate funding mechanism, to isolate and contain the experimental population; (6) a detailed description of the relationship of translocation to the status of the species and to future Section 7 determinations relative to either the parent population or the experimental population; and (7) a provision that the plan



proposed San Nicolas Island translocation and management zones

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Sea Otter

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would be administered in cooperation with the State.

The management zone is to be kept free of otters using nonlethal means, no formal Section 7 consultations will be required (only conferences), and incidental take of otters resulting from otherwise legal activities will not be a violation of the ESA or MMPA.

* * *

Numerous compromises have been made by various interest groups and agencies to get to this point. The new law generally represents a delicate consensus

among the major agencies and organizations on how the translocation should proceed, if it proceeds at all. If the project is ultimately carried out, probably no one will be perfectly pleased, but all should feel they had some say and got some consideration of their views.

In addition to the proposed action of translocating California sea otters to San Nicolas Island, the draft EIS evaluates five other alternatives, including:

- (1) translocation to the northern California coast;
- (2) translocation to the southern Oregon coast;
- (3) translocation to any one of the three sites (San Nicolas, northern California, southern Oregon) and, as a miti-

gation measure, stopping range expansion of the current population into southern California below Point Conception;

(4) giving additional protection to the existing population without a translocation; and

(5) no action.

The public comment period on the draft EIS and proposed rule ended November 17. Public hearings were held in Brookings, Oregon; Monterey, California; and Ventura, California. Depending on the complexity of public comments, we hope to issue a final rule and EIS by April 1987 and to implement the selected alternative in fall 1987.

Proposed Listings

(continued from page 1)

requirement for the FWS to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and the possibility of Federal aid to State or Commonwealth conservation departments that have signed Endangered Species Cooperative Agreements with the FWS. (Both Colorado and the Commonwealth of Puerto Rico have such agreements.) Listing also lends greater recognition to a species' precarious status, which encourages further

conservation efforts by State and local agencies, independent organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy. For species that are *proposed* for listing and

for which jeopardy is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or traffic in listed animals, except by permit for certain conservation purposes. For plants, the rule is different; the prohibition against collecting applies only to listed plants found on lands under Federal jurisdiction. Some States, however, have their own laws against take of listed plants.

Regional News

(continued from page 2)

temporarily placed them in aquaria until the refugium is cleaned and renovated.

* * *

The FWS Great Basin Complex at Reno, Nevada, recently completed a report that concerned the effect of operational procedures and equipment at the Marble Bluff Fish Facility on the health of cui-ui (*Chasmistes cujus*) and the safety of the facility's personnel. It also listed recommendations for solving health and safety problems before next year's spawning run. This report was an accumulation of ideas and recommendations from a brainstorming session held at the complex between FWS and Bureau of Reclamation personnel, who also assisted with the facility operations this year. Three approaches were developed for reducing cui-ui deaths and improving personnel safety.

The efforts to set aside a major Endangered species preserve for the San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia silus*), giant kangaroo rat (*Dipodomys ingens*), and California condor (*Gymnogyps californianus*) in the Carrizo Plain area are

moving forward. At a recent steering committee meeting, representatives of the involved oil companies committed to produce an initial draft of a plan that could be used as the basis for a Habitat Conservation Plan (HCP). At another meeting, the Bureau of Land Management, The Nature Conservancy, and the FWS decided to jointly prepare an acquisition study which will direct efforts to acquire the Carrizo Plain preserve.

* * *

An intensive field survey located 12 breeding pairs of the San Clemente Island loggerhead shrike (*Lanius ludovicianus mearnsi*) in 1986. A total of 16 young were produced. The researchers are confident that all existing pairs were located this year. The current total adult population of 24 represents a decline from a minimum population size of 28 birds in 1985.

* * *

California's San Luis Obispo County Board of Supervisors unanimously approved funds for the preparation of the Morro Bay Kangaroo Rat (*Dipodomys heermanni morroensis*) Habitat Conservation Plan. Interim guidelines for developing several single family homes on existing parcels in the species' Critical Habitat also were tentatively approved.

Several new populations of the Belkin's dune tabanid fly (*Brennania belkini*), a Category-2 listing candidate, have been found within an area of the Los Angeles Airport and in the adjacent dunes. This area has been proposed for development.

* * *

The Sacramento, California, Endangered Species Office (SESO) and the California Department of Fish and Game recently developed a draft Memorandum of Understanding to maintain the Owens tui chub's (*Gila bicolor snyderi*) recently designated Critical Habitat at the Hot Creek Hatchery. Results of a study to determine the Owens tui chub's habitat preferences will serve as the foundation for future development of a long-term management plan for the species.

* * *

In October, efforts to restore habitat of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) were initiated on two areas of the American River Parkway in Sacramento County, California. The SESO assisted in identifying the rehabilitation sites, which largely consist of exotic star thistle.

A new population of the valley elderberry longhorn beetle has been documented

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Regional News

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from along the Cosumnes River in Sacramento County. California Department of Fish and Game and FWS biologists had found suitable habitat along the Cosumnes River earlier this year. An adult specimen collected by a county agricultural agent during the mid-1960's has been positively identified as belonging to this rare species.

Recent surveys revealed that the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) makes limited use of the upland areas around the westernmost wetland habitat that is the site of the proposed Mori Point Condominiums. A plan will be developed to protect the sensitive areas on this site, which is located in San Mateo County, California.

The Marina City Council (California) will prepare a Habitat Conservation Plan for the coastal dune habitats in Monterey County that lie between Fort Ord and the mouth of the Salinas River. The prospective HCP will primarily address the Endangered Smith's blue butterfly (*Euphilotes enoptes smithi*) and will include conservation measures for the following plants and animals that are candidates for listing: Menzies' wallflower (*Erysimum menziesii*), Monterey Bay slender-flowered gilia (*Gilia tenuiflora* ssp. *arenaria*), pungent spineflower (*Chorizanthe pungens* var. *pungens*), and the black legless lizard (*Anniella pulchra nigra*).

A survey to determine bald eagle productivity at the Anderson Ranch and Cascade Reservoirs in Idaho showed that five nests, four new and one historic, fledged five young in 1986. There are now 26 occupied nests in Idaho, only 5 nests away from the recovery goal of 31.

As the Boise, Idaho, Endangered Species Field Office recommended, an ordinance to prohibit development within 1,500 feet of the South Fork Snake River was approved by Bonneville County. This area is particularly important to bald eagle and peregrine falcon recovery efforts in the greater Yellowstone ecosystem.

Region 2—According to the field project leader, this year's conservation effort on the Kemp's ridley sea turtle (*Lepidochelys kempii*) nesting beach at Rancho Nuevo, Mexico, was very successful. An unusually high hatching rate of 80 percent from protected nests at Rancho Nuevo is expected this year; 572 nesting females were encountered, which is slightly more than last year. Eggs were taken again this year for transplanting and imprinting on the

beaches at Padre Island, Texas. The hatch rate of Padre Island eggs (88 percent) remains quite high, due to the special handling and conditions.

The Trawling Efficiency Device, also known as the Turtle Excluder Device or TED, that has been under development and testing by the National Marine Fisheries Service (NMFS) for the last nine years may finally be put in the field. Regulations requiring the use of TEDs on shrimp trawls being towed where sea turtles are found are now being drafted by NMFS. However, conservation groups are worried that NMFS will only require TEDs in some areas or will continue to argue for voluntary cooperation by shrimpers, with mandatory use in the distant future.

Based on NMFS's estimates of 11,000 turtles killed per year, nearly 100,000 Endangered sea turtles, including about 7,000 Kemp's ridleys, may have been killed by the huge trawling fleet during the last nine years. This mortality level is important to all species, but is critical to the Kemp's ridley because researchers estimate that this species' population has declined to only 500-600 nesting females.

The TED works; it excludes turtles and also 50-70 percent of the by-catch (fish, horseshoe crabs, and big jellyfish). In the Gulf of Mexico alone, 1.5 billion pounds of fish are discarded every year by shrimp trawlers. The TED may even increase the shrimp catch. It will help shrimpers by reducing the sorting that needs to be done on deck and by effectively aiding them to keep within the law under the Endangered Species Act. It will also help the turtles by reducing the single greatest cause of turtle deaths in the Gulf of Mexico and southeast Atlantic.

Richard Byles, a sea turtle biologist, recently joined the endangered species staff in Region 2. He comes to the FWS with 12 years of experience with sea turtles in Florida, the mid-Atlantic States, and Mexico. For the past 6 years, he has worked on his doctorate at the Virginia Institute of Marine Science using biotelemetry to clarify the movements and behavior of sea turtles. Richard will be developing satellite tracking programs for the Kemp's ridley and other species of sea turtles.

During the past maternity season, two female Ozark big-eared bats (*Plecotus townsendii ingens*) were equipped with 0.7-gram radio transmitters as part of a test to determine the feasibility of using radio telemetry as a tool in the recovery of this species. The test was conducted only after handling and radio attachment techniques were developed on a similar, but unlisted, subspecies of big-eared bat. Preliminary results reported by the Oklahoma Cooperative Fish and Wildlife Research

Unit indicate that telemetry may be a limited management method on this species due to the short range of the small radio. The two bats did not seem encumbered by the transmitters and appeared to fly and roost normally. The glue attaching the transmitters allows the radios to fall off the bats after a few weeks. The battery life of the radios is only 7-10 days.

On September 20, 13 thick-billed parrots (*Rhynchopsitta pachyrhyncha*), 7 males and 6 females, were released into the Chiricahua Mountains of southeastern Arizona. Neck-collar radios were attached to six of the birds. The birds were held in flight cages at the release site 4 weeks in preparation of the release. Intensive observations for several days after the release indicated that the parrot's flights were strong, the flock's cohesion and social interaction appeared normal, and the birds responded appropriately to potential predators.

A second release of wild adult thick-billed parrots was made on October 19, also in the Chiricahua Mountains. Of the 16 birds released, 5 were equipped with radio transmitters. A few hours after release, most of the birds began associating with the flock of 10 parrots still present in the area from the initial release. A total of 22 birds fed together and roosted together that night. During the following week, the flock remained together, staying within a 5-mile radius of the release site and foraging mostly on wild foods (Mexican pinyon and Chihuahuan pine seeds). The birds have been drinking from potholes on top of nearby cliffs, and spending the nights in dense pine foliage.

Thick-billed parrots were once native to southeastern Arizona, although they have not been regularly observed since the mid-1930's. Habitat destruction, primarily logging, in the Sierra Madre Occidental of western Mexico continues to threaten the remaining wild populations.

All of the birds had been confiscated by FWS law enforcement agents as they were being illegally imported from Mexico as wild adults. If additional confiscated wild (as well as captive-reared) thick-billed parrots become available, this experimental reestablishment effort may continue for several years. The U.S. Forest Service, the Arizona Game and Fish Department, and the FWS are now in the process of entering into a cooperative agreement for the project.

Over 300 duplicate, 30-second public service announcements about whooping cranes (*Grus americana*) were distributed in 13 States for use by television and radio stations. The announcements were developed by the FWS Public Affairs Office in Region 2, in cooperation with the National Audubon Society and Edison Electric In-

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thick-billed parrot

stitute. The announcements are for use during the fall and spring whooping crane migration and should be useful for several years. The tapes describe identification features of whooping cranes, mention that they are Endangered and protected, note that they may be migrating through the viewer's area, and encourage observers to report sightings to wildlife agency personnel.

Other whooping crane educational efforts accomplished recently in a 13-State area include distribution of (1) the National Audubon Society's leaflet "Is It a Whooping Crane?"; (2) news releases about the pending migration and a description of chick production this summer; (3) reward signs that illustrate a whooping crane, sandhill crane, and snow goose, compare identification features of the three, and note that there is a reward for information leading to the arrest and conviction of anyone harassing, shooting, or attempting to take a whooping crane; (4) the Central Flyway Waterfowl Council bulletin, "Waterfowl Identification in the Central Flyway," which includes a section about identification of whooping cranes and birds similar in appearance; and (5) information about whooping cranes to be included with the

Federal permit required for all sandhill crane hunters.

An experimental sandhill crane hunt was held in the Middle Rio Grande Valley for the first time since 1916. Hunting occurred October 16-31 and was by special permit only. Each hunter had to complete a bird identification training course and pass a test before receiving a hunting permit. Over 500 hunters participated and voluntarily checked about 350 cranes at the checking stations. Three whooping cranes arrived in the valley before the hunt ended, but they remained on State and Federal lands that were closed to hunting.

About 1,300 masked bobwhite (*Colinus virginianus ridgwayi*) chicks were released on the Buenos Aires National Wildlife Refuge in Arizona during the past three months. An additional 400 birds were scheduled for release shortly thereafter. Most masked bobwhites were released with sterilized, wild, adult male Texas bobwhite (a related but non-endangered subspecies) foster parents, but a few were fostered to wild, adult scaled quail (also unlisted). Sightings of adult masked bob-

whites on the new refuge indicated good survival from last year's releases.

Proceedings of the December 1984 symposium on masked bobwhite biology and conservation, sponsored by the Arizona Game and Fish Department, National Audubon Society, and FWS, have been published and are available from the above agencies.

* * *

Texas A&M University, in cooperation with the FWS, has begun monitoring Navasota ladies'-tresses (*Spiranthes parksii*) populations. This Endangered orchid is a native of east Texas and is threatened by taking and by industrial, commercial, and residential development. The monitoring program, which will continue for several years, entails marking individual plants in the spring and checking for their presence during the fall flowering period. The monitoring of this unique orchid will lead to a better understanding of its population dynamics and to the development of proper management techniques.

* * *

Latest inventories show that the re-introduction of Knowlton's cactus (*Pediocactus knowltonii*) has been successful. Both groups of transplants—one planted in the fall of 1985, the other in the spring of 1986—had an overall survival rate of 94.7 percent. Most transplanted individuals showed an increase in stem diameter, 62 percent of the plants flowered, and 11 percent set fruit. These results indicate that transplanting is a potentially successful recovery technique for this species. For comparative purposes, twenty-four monitoring plots were established and inventoried at the type locality. Monitoring efforts at both sites will continue.

* * *

A public hearing was held in St. George, Utah, on September 15 concerning the proposed listing of the Virgin River chub (*Gila robusta seminuda*) as an Endangered species with Critical Habitat. (See story on proposed rule in BULLETIN Vol. XI No. 7.) Forty people attended the hearing and 13 presented information. About two-thirds of the presentations opposed listing, principally because of conflicts with economic development along the Virgin River.

Before and after the hearing, the Woundfin Recovery Team conducted its semiannual sampling effort on the Virgin River. The exotic red shiner (*Notropis lutrensis*) continues to move upstream into reaches once occupied only by native fish species. Another new threat to woundfin is a high rate of infestation of what appears to be Asian tapeworm. Collections directly below the outflow of the newly built Quail Creek Reservoir found only woundfin infected. Perhaps largemouth bass that were moved from Lake Mead carried in

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this new parasite. On the brighter side, Virgin River chubs have produced a very strong year class in 1986, the best in at least 3 years.

* * *

Biologists from the Bureau of Reclamation, Utah Division of Wildlife Resources, and FWS Regions 2 and 6 met in Durango, Colorado, to discuss conducting a fish survey of the San Juan River from Farmington, New Mexico, to Lake Powell. The San Juan River is a tributary of the Colorado River, flowing into what is now Lake Powell. Intensive sampling of the San Juan River will start in the spring of 1987. It is hoped that sampling results will provide information on the presence of rare fishes in the river, including the Endangered Colorado squawfish (*Ptychocheilus lucius*). Data will also be gathered on the potential use of the river for recovery of other listed or proposed Colorado River fishes.

* * *

Region 3—The twelfth annual Endangered Species Coordinators Meeting was held during the last week of October in Marshall, Indiana. Coordinators from the 8 States within Region 3 attended, as well as representatives from the Province of Ontario, Canada, the State of Arkansas, and the U.S. Forest Service. The primary purposes of the meeting were to review the efforts of the past year and plan strategies for the coming year.

* * *

In the Kirtland's warbler (*Dendroica kirtlandii*) research effort in Michigan this year, 27 warblers were trapped and color banded, and 6 were radio-tracked. One adult was followed for 9½ days, and five juveniles were tracked for up to 7 days. No problems were noted with the transmitters or the ability of the birds to carry them. Adults were noted to remain near the established territories, while the young tended to move about a mile or more from the nest area.

* * *

Approval was received for the Driftless Area acquisition project, which is designed to lay the foundation for efforts to protect the northern wild monkshood (*Aconitum noveboracense*) and the Iowa Pleistocene snail (*Discus macclintocki*). Several species that are candidates for Federal listing also will be protected.

* * *

The Illinois Department of Transportation reported the successful radiotracking of a juvenile female Indiana bat (*Myotis sodalis*) in Pike County, Illinois, using a 0.7 gram transmitter. No behavioral abnormalities were noted during the three-night tracking period. Day roosting was done in

the same bottomland cottonwood along an intermittent stream on both days. The bat exhibited a larger foraging range than had been expected from previous research, and preliminary indications are that the foraging was over corn and soybean fields. Mapping and a more detailed analysis of the bat's movements will be conducted.

* * *

The Regional Office staff, in conjunction with Regions 4 and 5, has been reviewing a petition to list the Appalachian Bewick's wren (*Thryomanes bewickii altus*), a Category-2 listing candidate, as an Endangered species. This bird appears to have surged into much of the Midwest in the late 19th century, and was common throughout the southern half of the region in the first decades of this century, but has dramatically diminished in the last few decades. Currently, Missouri has the only stable population in the Midwest. There is no known cause for the bird's decline.

* * *

Region 4—In an effort to determine the effectiveness of four types of the Trawling Efficiency Device (TED), the Georgia Marine Extension Service, utilizing the University of Georgia research vessel, *Georgia Bulldog*, conducted trawling activities off Cape Canaveral during August 12-23. The National Marine Fisheries Service, FWS, Florida Department of Natural Resources, South Carolina Wildlife and Marine Resources Division, Greenpeace and other organizations, universities, and agencies provided observers. A film crew from ABC's "20/20" news program was on board one day to film the trials.

Seventy-one sea turtles were captured; however, none were captured in nets equipped with TEDs. Finfish by-catch also was substantially reduced on nets with TEDs. A full report of the results and relative effectiveness of the different TEDs is being prepared by the Georgia Marine Extension Service.

* * *

Status surveys are being conducted, under contract through the Endangered Species Field Station in Jackson, Mississippi, for two Category-2 listing candidate species of freshwater mussels, *Arkansia wheeleri* and *Lampsilis streckeri*. *A. wheeleri*, a monotypic genus, is known from the Little and Ouachita Rivers in Arkansas and the Kiamichi River in Oklahoma. Efforts to collect this species alive in the 1980's have not been successful. While the survey will cover the mussel's historic range, the Ouachita and Kiamichi Rivers offer the best opportunity for success.

L. streckeri is known from the Little Red River in Arkansas and possibly from Onion and Salado Creeks in Texas. The type locality on the Little Red River was inundated by Greers Ferry Reservoir. A 1985

survey of Little Red River headwaters by the Arkansas Natural Heritage Commission found some individual mussels that appear to be *L. streckeri*. Additional specimens are necessary, however, before sufficient comparisons to confirm the identification can be conducted. The Texas records of this uncommon mussel are from the 1800's, and museum specimens to support these records do not exist. The survey will attempt to document the accuracy of these old records; results are expected in 1987.

* * *

In August, staff members of the Jacksonville, Florida, Endangered Species Field Station visited the Avon Park Air Force Range in Polk and Highlands Counties to determine the effect of a proposed aircraft runway extension on the recently listed Florida grasshopper sparrow (*Ammodramus savannarum floridanus*). Because the habitat area that was in question is submarginal for the Endangered sparrow and is small in size, it was determined that there would be no effect on the species from the proposed activity.

The Avon Park Air Force Range is one of the more unique biological areas managed in the Southeast by the U.S. military. Proposed and listed Endangered and Threatened species occurring there include not only the grasshopper sparrow, but the Florida scrub jay (*Aphelocoma coerulescens coerulescens*), Audubon's crested caracara (*Polyborus plancus audubonii*), bald eagle, red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana*), and eastern indigo snake (*Drymarchon corais couperi*). The range contains over 100,000 acres of land, of which between 3,000 and 5,000 acres are valuable Florida scrub, a habitat rich in wildlife that has been widely destroyed elsewhere by agricultural and housing developments.

* * *

Because of what appears to be a rather high level of insect damage to flowers and seed capsules of the Endangered green pitcher plant (*Sarracenia oreophila*) within some colony sites, a recent study was initiated by the Endangered Species Field Station in Jackson, Mississippi. The study will be carried out under a research work order through the Alabama Cooperative Fish and Wildlife Research Unit, Auburn University. The purpose of the study is to identify the predator species, determine the extent of damage and effects on the plant's reproduction, and recommend specific management/control measures.

* * *

Current population estimates indicate that the status of the only population of the Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) continues to be precarious. A survey conducted by Dr.

(continued on next page)

Nick Holler at the Perdido Key unit of Gulf State Park in Baldwin County, Alabama, provided a population estimate of 20 beach mice. This estimate, determined by live-trapping and mark-recapture techniques, is considered by researchers to be conservative. Another population estimate of 31.75 was derived by a geometric estimator (a mathematical formula used in surveying); however, because tests of equal catchability of marked and unmarked individuals were not conducted, this estimate also should be viewed with discretion. In any event, the number clearly is small.

* * *

An interior least tern (*Sterna antillarum* *athalassos*) nesting survey was conducted in the lower Mississippi Valley during May, June, and July 1986. The surveyed area included Cape Girardeau, Missouri, down the Mississippi River to Baton Rouge, Louisiana, the confluence of the Arkansas and Mississippi Rivers along the Arkansas to the Oklahoma State line, and from the confluence of the Red and Mississippi Rivers up the Red to the Louisiana/Arkansas State line. Twenty-eight colonies, consisting of 2,188 terns (the high count of three surveys), were observed along the Mississippi River between Cape Girardeau and Greenville, Mississippi. Two colonies, consisting of 50 terns, were sighted on the Arkansas River. No terns were spotted on the Mississippi south of Greenville or on the Red River. Cooperating agencies for the survey include the U.S. Army Corps of Engineers (St. Louis, Memphis, Vicksburg, New Orleans, and Little Rock Districts); the Missouri Department of Conservation; the Arkansas Natural Heritage Program; the Mississippi Department of Conservation; and the FWS Jackson, Mississippi, Endangered Species Field Office.

* * *

Region 5—Surveys to determine breeding pairs of piping plovers (*Charadrius melodus*) along the U.S. Atlantic coast have been completed for the 1986 nesting season. Approximately 553 breeding pairs were estimated to occur from Maine to North Carolina. This represents about a 16 percent increase over 1984 estimates. It is believed, however, that the increase is due to more thorough surveys rather than an actual increase in breeding birds. More than 80 percent of all the known breeding pairs of this species on the east coast occur in Massachusetts, New York, New Jersey, and Virginia.

* * *

During the week of September 29 - October 3, a New England television station, WCVB—Channel 5, featured a five-part series on endangered species as part of its nightly news program. Regional species of interest covered in the series included three listed species, the piping plover,

Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*), and right whale (*Balaena glacialis*); a bird recently proposed for listing, the roseate tern (*Sterna dougallii dougallii*); and the Sand Plain gerardia (*Agalinis acuta*), a Category-1 listing candidate plant. Richard Dyer, endangered species biologist, served as regional contact for the series, which was seen by a large New England audience. Future programs on other regional species are being discussed.

* * *

The Eastern Peregrine Falcon Recovery Team met in Boise, Idaho, on October 15. Subjects discussed included the status of funding for 1987, nesting and reintroduction results of 1986, planning of a State coordinators meeting for January 1987, and management of "saturated populations" (populations in which there are more birds than available nesting habitat). The meeting also included a tour of the World Center for Birds of Prey, which supplies peregrine falcons for all three peregrine recovery programs now under way in the United States. The group also viewed the Snake River Birds of Prey Area, which has some of the densest nesting populations of golden eagles (*Aquila chrysaetos canadensis*) and prairie falcons (*Falco mexicanus*) in the U.S.

* * *

The State of West Virginia has entered into an Endangered Species Act Section 6 cooperative agreement with the FWS for plant conservation. Funding has been requested by the State to undertake conservation efforts for the running buffalo clover (*Trifolium stoloniferum*), a species that is currently proposed for listing as Endangered. (See story in BULLETIN Vol. XI No. 4.) Only four plants of this extremely rare species are known to survive in the wild.

* * *

Region 6—On August 27, personnel of the Wyoming Game and Fish Department (WGFD) met to review the current available data on black-footed ferrets (*Mustela nigripes*) to determine how many of the remaining wild ferrets should be taken for the captive breeding program. After reviewing all the data, they determined that too few ferrets remained near Meeteetse to prevent loss of this population. Therefore, they decided that all of the known wild ferrets near Meeteetse should be captured. This action had also been recommended by the Captive Breeding Specialist Group of the International Union for the Conservation of Nature and Natural Resources.

Trapping started on August 27 and will continue until all known ferrets have been captured. Newly captured animals are being placed in isolation to ensure that they are free of disease. After a period of isolation, the ferrets will be placed at the WGFD's new breeding facility at the Sybille Wildlife Research Unit near Wheat-

land, Wyoming. A new building is now being constructed for this facility.

As of September 22, a total of 11 ferrets (1 adult male, 3 juvenile males, 2 adult females, and 5 juvenile females) had been captured. These animals, combined with the 6 ferrets captured in 1984, have increased the captive population to 17. One known wild ferret near Meeteetse was not captured, but it is still believed to be occupying the study site. Efforts to locate and trap this ferret will be made when winter snow tracking conditions exist.

* * *

On August 25 and September 25, members of the Platte River Steering Committee met to discuss progress on the multi-State/agency effort to resolve Endangered species and water development issues on the Platte River in Wyoming, Colorado, and Nebraska. Of primary concern is to place greater emphasis on analyzing data and developing instream flow models to help answer specific questions. The relationships between Endangered birds, including the whooping crane, least tern, and piping plover, as well as other migratory birds, continue to be discussed.

Aerial surveys for the fall whooping crane migration began October 15. Whooping cranes have been sighted in Colorado, Kansas, Nebraska, Oklahoma, and Saskatchewan, Canada. The Canadian sighting is the only one of a single family group. The other sightings were of one and two birds.

* * *

Region 7—Over 2,000 river miles were surveyed for peregrine falcons in 1986. In addition to the four principal study areas described in the *Peregrine Falcon Recovery Plan-Alaska Population*, several smaller drainages and tributaries of major rivers were surveyed. Populations along the four study areas continue to increase. The upper Yukon, Colville, and Sagavanirktok River populations appear to be approaching pre-DDT levels, and the Tanana River population, the slowest of the four study areas to show signs of recovery, had the highest number of occupied sites since 1968.

Surveys of American peregrine falcons (*Falco peregrinus anatum*) in interior Alaska found 109 adult pairs and 205 young. North Slope surveys of Arctic peregrine falcons (*F. p. tundrius*) yielded 49 adult pairs and 69 young. Productivity for successful nesters averaged 2.44 and 2.65 for the interior and North Slope, respectively.

Two peregrines banded as nestlings in Alaska have been recovered so far this year. One, banded on the Charley River in 1985, was recovered in El Salvador in February 1986. The other was banded in

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1986 on the lower Yukon River and recovered in western Montana in September 1986.

* * *

A request for formal Section 7 consultation (under the Endangered Species Act) has been received from the U.S. Navy regarding the proposed construction and operation of a relocatable Over-the-Horizon (OTH) radar facility on Amchitka Island in the Aleutians. At issue is the effect of construction and operation of the facility on the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*). Amchitka was the site of underground nuclear testing by the Atomic Energy Commission during the period 1965-1971 and it later served as the site for an Aleutian goose propagation facility. The island has been uninhabited since the FWS abandoned the propagation facility in 1980. The FWS' commitment of restoring Aleutian geese to this island dates back to 1949, when efforts began to rid Amchitka of introduced arctic foxes (*Alopex lagopus*). Since 1980, nearly 350 captive-raised and wild-caught Aleutian geese have been released on Amchitka Island.

* * *

Region 8 (Research)—Biologists at the Condor Research Center in Ventura, California, began trapping operations at the Hudson Ranch on September 4 to bring the remaining three wild California condors, all males, into captivity to add to the captive breeding program. As of November 30, no condors had been caught, although they had been sighted near the trap site.

* * *

Sipsey Fork, a stream in north-central Alabama, contains the largest known pop-

BOX SCORE OF LISTINGS/RECOVERY PLANS								
Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	5	0	22	314	23
Birds	61	16	141	3	2	0	223	55
Reptiles	8	6	60	9	4	13	100	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	6	0	81	43
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	4	0	0	1	0	0	5	1
Insects	8	0	0	5	0	0	13	12
Plants	106	6	1	24	3	2	142	54
TOTAL	282	52	466	76	15	37	928	243**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 207
 Number of species currently proposed for listing: 24 animals
 35 plants

Number of Species with Critical Habitats determined: 96
 Number of Cooperative Agreements signed with States: 47 fish & wildlife
 26 plants

October 31, 1986

ulation of the flattened musk turtle (*Sternotherus depressus*), a species currently proposed for listing. (See BULLETIN Vol. X No. 12.) The stream was surveyed during July 1986 to determine the effects of a severe disease initially observed during surveys in 1985. In 1985, the population declined by 50 percent from the end of June through late July; however, the 1986 survey found no additional decline. The population structure was similar between the years, although the sex ratio changed

slightly. The overall trap success ratio in 1986 was similar to 1985, but was less than that of previous studies. No severely diseased turtles were found in 1986, although about 12 percent had mild symptoms and 17 percent showed evidence of recovery. Assessing the importance of the disease to the decline in the population is hampered by the activities of commercial collectors who are known to have removed turtles from Sipsey Fork in July 1985.

* * *

October—November 1986

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
 Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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A Bird and Three Plants Proposed for Listing

During November 1986, the following bird and plant taxa were proposed for addition to the U.S. *List of Endangered and Threatened Wildlife and Plants*:

Roseate Tern (*Sterna dougallii dougallii*)

A graceful, dove-sized coastal bird, the roseate tern is similar in appearance to several other species of terns occurring in the United States and elsewhere throughout the world. Terns nest on the ground, usually in dense colonies. Often, two or more species share the same nesting colonies. Although all tern species face the same kinds of problems, roseate terns in the U.S. and the Caribbean are particularly vulnerable because their nesting populations are small, localized, and subject to competition and predation from other animals. Accordingly, the FWS has proposed listing these roseate tern populations as Endangered and Threatened, respectively (F.R. 11/4/86).

Of the five subspecies of roseate terns recognized worldwide, only *S. d. dougallii* occurs in the Northern Hemisphere. It is comprised of three widely separated breeding populations in the northeastern coast of North America, certain islands in the Caribbean Sea, and the coast of northwestern Europe. Migrants from the northeastern U.S. winter primarily off the north coast of South America from Columbia to eastern Brazil. The wintering grounds of the Caribbean birds are still unknown, but may be in the same general areas.

Although the roseate tern's nesting range in northeastern North America is often given as extending from Nova Scotia to Virginia or North Carolina, it was only common in the central part of this range (Massachusetts to Long Island), and in recent years has all but disappeared from the periphery. In the Caribbean region, most roseate terns nest in Puerto Rico and the U.S. Virgin Islands, although significant numbers have been reported from the Bahama Islands, and some nest in the Dry Tortugas and the lower Florida Keys. Population trends for roseate terns in the Caribbean are not as clear as for the northeast, but they face similar threats.

Loss of nesting habitat has been a major factor in the species' decline in the north-

east, where almost all important colonies of roseate terns are on small coastal islands. Nesting habitat for the northeastern North America population has been greatly reduced by human development of such islands, particularly those with sandy beaches. In the Caribbean region, almost all recorded breeding sites have been on small islets that, although too small for development, are regularly visited by "egggers" who collect large numbers of tern eggs for human consumption.

Competition for the remaining breeding sites is another problem. In southern New England, many traditional sites were abandoned by the roseate tern in the 1940's and 1950's when herring (*Larus argentatus*) and great black-backed (*L. marinus*) gulls rapidly expanded their nesting ranges southward into that region. These large, aggressive gulls gradually took over the nesting grounds on most of the outer islands that were preferred by terns, forcing them into sites that often were closer to shore and therefore more accessible to other predators and human disturbance. The impact of gulls is illustrated by the fact that 60 percent of all

nesting roseate terns in the northeastern population, as well as large numbers of common terns, are supported on one Massachusetts island where a gull removal program was implemented.

The main reason why roseate terns breed most successfully on small islands is the lack of predatory mammals, including foxes, skunks, and rats. If such predators gain access, the terns soon abandon the site. (In the Caribbean, the mongoose also is a problem.) Predatory birds, particularly the great horned owl (*Bubo virginianus*) and the black-crowned night-heron (*Nycticorax nycticorax*), pose an even greater threat because they can fly over water to the islands. Although the adult terns are not highly vulnerable to most predators other than humans, the eggs and young are, and reproduction for an entire colony can be wiped out in a relatively short time.

Human predation on roseate terns nesting is of some importance in the Caribbean, where the collection of eggs is still a common, although illegal, practice. Another major cause of the roseate tern's decline may

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Terns are graceful, whitish seabirds with black caps and long, forked tails. The roseate tern (above) can be distinguished from other species in North America by its mostly black bill and a slight rosy tint on its breast during summer. In winter, the black cap is largely replaced with a white forehead. Both sexes look alike.



Regional News

Endangered Species Program regional staff members have reported the following activities for the month of November:

Region 1—The California Native Plant Society, in conjunction with several State

of California and Federal agencies (including the Bureau of Land Management, U.S. Forest Service, and Fish and Wildlife Service), conservation groups, and private corporations, sponsored a conference for the conservation and management of rare

and endangered plants on November 5-8, 1986. Over 800 people attended the 4-day conference held in Sacramento. The conference included papers and workshops on plant ecology and systematics, population dynamics, mitigation for project impacts, long-range planning, propagation and reintroduction techniques, preserve design, current conservation activities, rare plant survey techniques, habitat enhancement, legal mandates, education, and public involvement.

* * *

The Desert Fishes Council held its 18th annual symposium in St. George, Utah. The expanded agenda filled 3 days and included topics ranging from protection of small desert springs to preserving flows in the Colorado River. Special sessions included management of the Ash Meadows National Wildlife Refuge and the potential use of the Colorado squawfish (*Ptychocheilus lucius*) as a game species. More than 25 FWS people from three regions and the Washington Office attended.

* * *

Region 2—In late October, President Miguel de la Madrid of Mexico signed legislation that named and geographically defined 16 sea turtle nesting refuges along the coastal regions of the Republic of Mexico. Protected areas include nesting beaches on the Pacific coast for the Olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) sea turtles, and nesting beaches along the Atlantic Gulf coast for Kemp's ridley (*L. kempii*), hawksbill (*Eretmochelys imbricata*), and Atlantic green (*Chelonia mydas*) sea turtles. This commendable action by Mexico is the result of the efforts of many government employees and other Mexicans who continue to work to conserve their country's sea turtle resources. The Ministries of Fisheries, Urban Development and Ecology, and the Mexican Navy support this decree and are responsible for its implementation.

* * *

Region 2 has planned a joint plant recovery team meeting in Albuquerque for January 13-15, 1987. These annual plant recovery team meetings provide team members the opportunity to jointly discuss and advise the FWS on topics regarding Endangered and Threatened plants. This meeting will bring together the teams from Arizona, New Mexico, and Texas, along with other invited participants, for presentations and discussions on several topics of interest, including minimum viable populations, monitoring, and recovery actions by botanical gardens.

* * *

Leslie Canyon in southeastern Arizona may be acquired by the FWS in the near future.

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Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide.

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Red Wolves Moved to North Carolina

In a step toward the reintroduction of the Endangered red wolf (*Canis rufus*) into the wild, four pairs were flown November 12 from captive propagation facilities to acclimation pens at Alligator River National Wildlife Refuge in North Carolina. These

wolves will be held at the release site for 6 months in an effort to acclimate them to their new environment. The FWS plans to release three of the pairs into the wild in April 1987, keeping the fourth pair in reserve as a back-up.

Release of the red wolves, as the first step in a planned establishment of an experimental population, was proposed by the FWS on July 24 (see story in BULLETIN Vol. XI No. 8-9) and approved November 19.



photo by Steve Maslowski

red wolf

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(continued from page 2)

future. Leslie Creek is one of the few remaining perennial streams in southern Arizona. The acquisition of the creek and its riparian vegetation community is identified in two recovery plans as a key step in the recovery of four listed Yaqui River fishes. Leslie Creek is one of only three areas in the United States where the Yaqui fishes can be recovered. Species that would be protected within this future refuge include the Yaqui chub (*Gila purpurea*), Yaqui catfish (*Ictalurus pricei*), beautiful shiner (*Notropis formosus*), and Sonoran topminnow (*Poeciliopsis occidentalis sonoriensis*).

The current owner of Leslie Creek has offered to sell the 1,200-acre parcel of his ranch to The Nature Conservancy (TNC). Once purchased by TNC, the area would be sold to the FWS and managed as a satellite of the San Bernardino National Wildlife Refuge, where recovery actions for the Yaqui fishes are already under way.

* * *

Twenty of the 21 fledging-age whooping crane (*Grus americana*) chicks seen in Canada in August had arrived at Aransas National Wildlife Refuge in Texas by November 20. The parents of the twenty-first chick arrived without their chick, and it is presumed dead. Late November aerial surveys at Aransas were not completed

because of aircraft problems. With the excellent survival of the chicks that migrated to Aransas, this population could reach to 110 birds this winter.

The season's final significant flight of cranes into the middle Rio Grande Valley of New Mexico occurred on November 23 in association with a cold front. Five whooping cranes and an estimated 4,500 sandhill cranes (*Grus canadensis*) arrived from Colorado on that date. The Rocky Mountain whooping crane population is expected to be 25-27 birds.

* * *

Region 4—The Florida panther (*Felis concolor coryi*) captive breeding program (continued on page 7)

Proposed Listings

(continued from page 1)

be the killing of wintering terns along the northeastern coast of South America for human consumption.

Because the roseate tern is thought to be in danger of extirpation from northeastern North America, the FWS proposed listing the birds in that region as Endangered. In the Caribbean, where the roseate tern's status is considered serious but not as critical, the FWS proposed to list it as Threatened. Comments on the listing proposals should be sent to the Regional Director, Region 5 (address on page 2 of the BULLETIN), by January 5, 1987.

Miami Palmetto (*Sabal miamiensis*)

With fewer than 11 individuals known to survive in the wild, the Miami palmetto may be the rarest plant species in Florida. In the early twentieth century, this member of the palm family (Arecaceae) was collected in the pinelands of the south Florida limestone ridge from Fort Lauderdale (Broward County) south to Miami and west to Kendall. Since that time, extensive conversion of pinelands to residential and commercial uses has reduced the range of the Miami palmetto to two sites, both in Dade County. At one site, along a fence at the edge of a construction project, three plants remain as part of what once had been a sizeable population, and even these survivors are expected to be removed soon. The only other Miami palmetto site is within a county park, where there are six to eight plants.

Fairchild Tropical Garden, a major botanical garden in Miami, is working to propagate the species from seed, and it will work with the FWS to implement reintroduction efforts. In the meantime, however, because the status of the Miami palmetto in the wild is extremely precarious, the FWS has proposed to list it as Endangered (F.R. 11/4/86).

Comments on the listing proposal are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207, by January 5, 1987.

Florida Bonamia (*Bonamia grandiflora*)

This perennial vine in the morning glory family (Convolvulaceae) is restricted to south-central Florida in sand pine "scrub" habitat consisting of evergreen oak scrub (*Quercus* spp.) and sand pine (*Pinus clausa*) with sandy openings between the trees and shrubs. The sunny, bare patches needed by the bonamia are created by infrequent, severe fires or by mechanical disturbance. Fire suppression, which allows



***Sabal miamiensis* (in foreground) is a large-fruited dwarf palmetto with no above-ground stem. Each plant has three to six fan-shaped, yellow-green leaves.**

vegetational succession in the openings, is one threat to the bonamia. An even greater danger is the widespread conversion of native scrub habitat to citrus groves and urban development.

The Florida bonamia is extirpated from Sarasota, Manatee, Osceola, Volusia, and Lake Counties, and is reduced in the remainder of its range. It still survives in Ocala National Forest (Marion County) and at 18 sites to the south: one in Hardee County; 2 in Highlands County; 5 in Orange County; and 10 in Polk County. However, the factors that led to the species' decline continue, prompting the FWS to propose listing the plant as Threatened (F.R. 11/4/86).

The scrub vegetation occupying the central Florida sand ridge is extremely unique and contains numerous endemic species. In

response to the continuing modification and loss of this habitat, the FWS has in recent years listed or proposed listing 13 other plants and 4 animals, all of them endemic to sand pine scrub.

B. grandiflora does not occur within the densely wooded sections of Ocala National Forest, but along the forest edges, road rights-of-way, and fire lanes. The U.S. Forest Service's current management and its new Land and Resource Management Plan appear to be beneficial to the species. One other bonamia site, which is found within The Nature Conservancy's Tiger Creek preserve in Polk County, is protected, although land acquisition has not yet been completed. Because *B. grandiflora* already is listed under Florida law as endangered, the

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drawing by B. E. Tatje

***Bonamia grandiflora* is a vine with sturdy prostrate stems approximately 3 feet (one meter) in length and small leathery leaves. Its funnel-shaped flowers are a pale but vivid blue with a paler center, similar to the cultivated "Heavenly Blue" morning glory.**

State regulates taking, transport, and sale of the plant, but habitat conservation is not ensured. Listing it under the Federal Endangered Species Act will augment and reinforce existing protective measures.

Comments on the listing proposal are welcome, and should be sent to the Jacksonville Office by January 5, 1987.

Bradshaw's Lomatium (*Lomatium bradshawii*)

The Bradshaw's lomatium, a small, herbaceous perennial plant in the parsley family (Apiaceae), is endemic to the lowland prairie community of the Willamette River Valley in Oregon. Once distributed throughout the valley and apparently abundant, this species now is composed of only eight or nine remnant populations where prairie habitat has so far escaped conversion to agriculture and other uses. These populations range in size from several thousand plants to only a few individuals, and their potential for long-term survival also varies. *L. bradshawii* has been proposed for listing as Endangered (F.R. 11/21/86).

Although the loss of native prairie habitat to agricultural uses has been the most significant factor in the species' decline, expanding residential and industrial development threatens much of the remaining habitat. For example, over 90 percent of the plants now are concentrated in a population near Willow Creek, at the city limits of Eugene, on privately owned land that has been under consideration in the past for residential development. The site, however, is currently under lease to The Nature Conservancy, and the local community is negotiating in an attempt to preserve the land. The Willamette daisy (*Erigeron de-*

cumbens var. *decumbens*), a Category 2 candidate for a future listing proposal, also occurs at the site.

Another threat to the Bradshaw's lomatium is fire suppression, which allows the encroachment of competing woody plants. One small population located on the William L. Finley National Wildlife Refuge (NWR) probably has benefited from the use of controlled burning as a habitat management practice. Future refuge management will include provisions to improve the status of this population.

In addition to the *L. bradshawii* site on Finley NWR, there are two other populations on federally managed public lands. One of the largest remaining populations is on lands managed by the U.S. Army Corps of Engineers located adjacent to the Fern Ridge Reservoir. There is also a remnant population on land administered by the Bureau of Land Management (BLM) near the Long Tom River; half of that population was destroyed when adjacent private lands were plowed. If the listing proposal becomes final, these Federal agencies will be required to ensure that their activities are compatible with conservation of *L. bradshawii* habitat.

Comments on the listing proposal should be sent to the Regional Director, Region 1, by January 20, 1987.

* * *

Available Conservation Measures

Among the conservation benefits provided by a listing as Threatened or Endangered under the Endangered Species Act are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the FWS

to develop and implement recovery plans; the possibility of Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its designated Critical Habitat. If any agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy or adverse modification. For species that are *proposed* for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding. Potential conflicts almost always are avoided by planning early and using the Section 7 process.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals, except by permit for certain conservation purposes. For listed plants, the rule is different; the trafficking restrictions apply, but collecting of listed plants is prohibited without a permit only on lands under Federal jurisdiction. Some States, however, have their own laws protecting listed plants and animals that may be more restrictive.

The Working Group — A Missing Link

Robert M. Hazelwood
U.S. Fish and Wildlife Service
Helena, Montana, Field Office

For many Endangered and Threatened species, recovery teams have played an important role in the preparation of recovery plans and in other important facets of recovery. However, throughout the nation, other species-oriented groups are influencing and coordinating management of specific species on a daily basis. Recent efforts have shown that such working groups can be a very effective force in wildlife management.

In the western United States, inter-agency working groups have been quite successful with two Endangered species, the bald eagle and peregrine falcon. These interagency working groups are made up of professional biologists from State and Federal agencies, along with public and private organizations, that are involved in management and protection of listed species and their habitat. The basic purpose

of these working groups is to assist in implementing recovery plan objectives and to coordinate management, research, and information exchange in their respective geographical areas. Two of the four designated bald eagle working groups have completed management plans for their specific areas. It should be noted that these management plans are not intended to replace the Pacific States Bald Eagle Recovery Plan, but to serve as an *extension* of the recovery plan, stepping down and localizing management recommendations that are only summarized in national or regional recovery plans.

Working groups generally meet formally twice a year. In addition, individuals on local subcommittees assume major workload assignments to be carried out throughout the year. The data collection and dissemination by these groups are useful for tracking recovery efforts and implementing recovery tasks. Recently the Montana and Greater Yellowstone Ecosystem Bald Eagle Working Groups combined efforts to synthesize management

and recovery of the peregrine falcon and bald eagle. Efforts of this tri-State (Montana, and Wyoming) cooperative approach have been encouraging.

The trial period for the working group approach is now over, and the verdict is clear. These groups can serve as an intrinsic link between recovery planning and implementation. They also offer an easy way to enhance coordination and avoid duplication of effort among all involved agencies. Ultimately, this means there can be more effective and efficient use of the limited funding available.

Copies of the management plans discussed above can be obtained from the following locations:

Bald Eagle Management Plan for the Greater Yellowstone Ecosystem, Special Publications, Wyoming Game and Fish Department, Cheyenne, Wyoming 82002 (price - \$10.00 per copy); *Montana Bald Eagle Management Plan*, Bureau of Land Management, Montana State Office, P.O. Box 36800, Billings, Montana 59107.

Vandalism of Small Whorled Pogonia



Isotria medeoloides (small whorled pogonia)

Thomas J. Rawinski
The Nature Conservancy
Boston, Massachusetts

The small whorled pogonia (*Isotria medeoloides*) is a terrestrial orchid that was listed by the Fish and Wildlife Service in the September 10, 1982, *Federal Register* as an Endangered Species. In New Hampshire, where most *Isotria* sites are monitored annually, a population in Milton consisting of approximately eight stems was found on June 24, 1986, to have been vandalized. Instead of finding the plants, Nature Conservancy ecologist Tom Rawinski and Cornell University botanists Dr. Philip Dixon and Dr. Robert Cook found 7 recently dug holes measuring roughly 2 inches wide by 3 inches deep. All of the pogonias had been removed from the population, which had occupied an area of 20 by 50 yards and had been monitored annually since 1980.

Though the location of this population has been kept confidential by staff of the New Hampshire Natural Heritage Inventory, the station could have been found by the perpetrator(s) using location data obtained from an older herbarium specimen. This incident serves to demonstrate the vulnerability of *Isotria medeoloides*. With rigorous monitoring and educational campaigns, it is hoped that such deliberately destructive activities can be prevented in the future.

Because of their intimate association with certain soil fungi, it generally is very difficult to successfully transplant terrestrial orchids.

drawing by Susan Edwards,
courtesy of the Natural Resources
Defense Council

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progressing as planned. The male panther that was injured by an automobile in south Florida in November 1984 has been transferred to the captive breeding facility located north of Jacksonville. The panther appears to have adapted well to his new environment.

The next phase of the project is to determine if the male is capable of breeding. To test this, two female cougars of non-listed western subspecies were captured and transported to the breeding site. The females were placed in their respective pens, located on each side of the male's pen. After a period of adjustment, the females began to move around their pens, but little interest was shown by either sex. Recently, however, one of the females cycled, and the male began to show a great deal of interest. Both the female and male walked together up and down the enclosure, separated by the fence. As of December 1, the cats had not been placed together, but a breeding attempt is planned for when the female cycles again.

. . .

The scrub lizard (*Sceloporus woodi*) is endemic to Florida, where it occurs in scrub habitats along the central ridge of the State, as well as along the Atlantic coast and in a small area on the southwestern gulf coast. A status survey for this species, which is a Category-2 candidate for Federal listing, is being carried out by the Florida Cooperative Fish and Wildlife Research Unit. An interim report indicates that the scrub lizard may be extirpated along the Gulf Coast. Several known sites along the Atlantic coast have been eliminated, but over 30 new sites were discovered. Unfortunately, many of these sites are subject to future development. The status of the species in the central and largest part of its range will be addressed in the final report. The scrub lizard is threatened by the conversion of scrub veg-

etation for agricultural, residential, and commercial purposes.

. . .

North Key Largo, Florida, is one of three remaining nesting areas for the Endangered American crocodile (*Crocodylus acutus*). A nest survey and monitoring program was initiated on Key Largo in 1978. Nest numbers have fluctuated between three and five nests annually; this year, six nests were discovered. A crocodile nest usually holds about 30 eggs. However, of the estimated 180-200 eggs laid this season, only 90 to 100 eggs hatched. Three nests failed completely. Biologists attribute this year's low hatching rate to the dry winter and summer weather.

. . .

A Gopher Tortoise Relocation Symposium is scheduled for June 27, 1987, in Hume Auditorium at the University of Florida at Gainesville. The symposium, sponsored by the Florida Game and Fresh Water Fish Commission, the Gopher Tortoise Council, and the Florida State Museum, will evaluate the effectiveness of gopher tortoise (*Gopherus polyphemus*) relocation as a management technique or as a mitigative measure in instances of conflicting land use objectives. Those interested in attending and/or submitting a paper or note should contact: Don A. Wood, Division of Wildlife, Florida Game and Fresh Water Fish Commission, 620 South Meridian, Tallahassee, Florida 32301.

. . .

Region 5—Status survey work on 33 plants contracted to The Nature Conservancy in 1985 has been completed. Thirteen of the 33 species surveyed are being considered by the regional staff for possible Endangered Species Act listing proposals.

. . .

Members of the Atlantic Coast Piping Plover Recovery Team and representatives from private conservation groups,

State fish and wildlife agencies, the Canadian Wildlife Service, and independent researchers met in Newton Corner, Massachusetts on November 18 and 19 to discuss the preliminary draft recovery plan. The plan will be revised based on comments received, and the review draft will be circulated in January 1987 for formal comment.

. . .

Draft revisions to the *Chesapeake Bay Bald Eagle Recovery Plan* and *Eastern Peregrine Falcon Recovery Plan* have been made. The draft plans will be submitted to Washington for review in the near future.

. . .

Region 6—A record number of whooping crane sightings (Wood Buffalo National Park-Aransas National Wildlife Refuge flock) were reported to the FWS Migration Monitoring Center at the Grand Island Field Office Complex in Nebraska during the 1986 fall migration. A total of 31 confirmed sightings of one or more birds were reported. One of those was on the Platte River Critical Habitat area, where three whoopers were seen. The sightings were distributed as follows: North Dakota—2, South Dakota—4, Nebraska—4, Kansas—12, and Oklahoma—9. Observations of 18 different color-banded birds were reported.

The peak of the migration occurred during the first week in November, about one week later than normal. The late migration was probably due to very mild weather during October. The most popular area during migration was the Cheyenne Bottoms State Wildlife area in central Kansas, where 26 whoopers stopped November 3-8.

. . .

Region 7—An American peregrine falcon (*Falco peregrinus anatum*), banded as a nestling near Aniak, Alaska, this past July was killed November 18 in a collision
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whooping cranes

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with a commercial airliner at San Jose, California. This is the forty-ninth band return since systematic banding of Alaska's peregrines began in 1979. Returns from such diverse locations as Washington, North Carolina, Texas, El Salvador, Ecuador, Brazil, and Argentina provide information on peregrine migration routes and wintering areas.

* * *

A number of new zoos joined the list of Aleutian Canada goose (*Branta canadensis leucopareia*) cooperators last year. A total of 17 facilities in the United States and Canada now have Aleutian geese for breeding and display purposes. The Tama and Yagiyama Zoos in Japan also have Aleutian geese, and successfully raised young in 1985 and 1986. A small number of geese were released in Japan near Lake Izunuma in hope that they would join a wild flock of white-fronts and reestablish a migratory tradition. The Japanese plan to release five more young birds this fall. In total (U.S., Japan, and Canada), 16 goslings were raised in captivity in 1986 and the captive flock now numbers 118 birds.

* * *

Endangered Wildflower Calendar

The 1987 *Endangered Wildflower Calendar* is now available from the American Horticultural Society (AHS). This 8½-by 23-inch wall calendar features full-color photographs of 16 rare American

wildflowers, individual summaries on their status, and general information on endangered plants. Proceeds from the calendar sales enable the AHS to award up to \$250 to non-profit organizations whose members or supporters provide information on the rediscovery of plants generally thought to be extinct. To order, send \$6.95 per calendar (\$6.25 for AHS members) to Jeanne Eggeman, AHS, P.O. Box 0105, Mount Vernon, Virginia 22121.

For orders of 3 or more calendars, send \$6.45 for each (\$5.75 for AHS members). These prices include postage and handling, but Virginia residents should add 4 percent sales tax.

For the AHS list of plants that are considered extinct, send a self-addressed business-sized envelope and \$1.00 for postage and handling to the Wildflower Rediscovery Project at the same address.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	5	0	22	314	23
Birds	61	16	141	3	2	0	223	55
Reptiles	8	6	60	9	4	13	100	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	6	0	81	43
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	4	0	0	1	0	0	5	1
Insects	8	0	0	5	0	0	13	12
Plants	106	6	1	24	3	2	142	54
TOTAL	282	52	466	76	15	37	928	243**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 207

Number of species currently proposed for listing: 25 animals
38 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

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